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    Riechmann, Jose-Luis
    Keddie, James
    Pineda, Omaira
    Adam, Luc
    Samaha, Raymond
    Zhang, James
    Yu, Guo-Liang
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Ser Leu Ala Ala Val Glu Gly Ser Gln Asn Ala Ser Cys Asp Asn Asp 65 70 75 80

Gly Lys Phe Glu Asp Ser Gly Asp Ser Arg Lys Arg Leu Gly Pro Val 85 90 95

Lys Gly Lys Arg Gly Cys Tyr Lys Arg Lys Lys Arg Ser Glu Thr Cys 100 105 110

Thr Ile Glu Ser Thr Ile Leu Glu Asp Ala Phe Ser Trp Arg Lys Tyr 115 120 125

Gly Gln Lys Glu Ile Leu Asn Ala Lys Phe Pro Arg Ser Tyr Phe Arg 130 135 140

Cys Thr His Lys Tyr Thr Gln Gly Cys Lys Ala Thr Lys Gln Val Gln 145 \$150\$

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Ala Thr Gly Thr Asp Lys Ile Ile Ser Thr Glu Gly Gln Arg Val Gly
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Ile Lys Lys Ala Leu Val Phe Tyr Ile Gly Lys Ala Pro Lys Gly Thr 115 120 125

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Arg Asn Gly Ser Thr Lys Leu Asp Asp Trp Val Leu Cys Arg Ile Tyr 145 150 155 160

Lys Lys Gln Ser Ser Ala Gln Lys Gln Val Tyr Asp Asn Gly Ile Ala 165 170 175

Asn Ala Arg Glu Phe Ser Asn Asn Gly Thr Ser Ser Thr Thr Ser Ser 180 $$185\$

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Asn Arg Asn Phe Gln Phe Ser Asn Pro Asn Arg Ile Ser Ser Leu Arg 210 215 220

Pro Asp Leu Thr Glu Gln Lys Thr Gly Phe His Gly Leu Ala Asp Thr 225 230 235

Ser Asn Phe Asp Trp Ala Ser Phe Ala Gly Asn Val Glu His Asn Asn 245 \$250\$

Ser Val Pro Glu Leu Gly Met Ser His Val Val Pro Asn Leu Glu Tyr 260 265 270

Asn Cys Gly Tyr Leu Lys Thr Glu Glu Glu Val Glu Ser Ser His Gly 275 280 285

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Leu Leu Glu Ile Ser Tyr Arg Gly Ile His Ser Cys Ser Gln Ala Ala 165 170 175

Asn Val Gly Thr Thr Met Pro Ile Gln Asn Leu Glu Pro Asn Gln Thr 180 185 190

Gln Glu His Gly Asn Leu Asp Met Val Lys Glu Ser Val Asp Asn Tyr 195 200 205

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Thr Pro Asn Leu Glu Asn Asn Asn Ala Tyr Met Leu Gln Met Arg Asp 225 230230235

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Ile Gln Val Asp Pro Arg Ile Asp Asp His Asn Asn Asn Ile Lys Ile 50 60

Asn Tyr Asp Ser Ser His Asn Gln Ile Glu Ala Glu Gln Pro Ser Ser 65 70 75 80

Asn Asp Asn Gln Asp Asp Asp Gly Arg Ile His Asp Lys Met Lys Arg 85 90 95

Arg Leu Ala Gln Asn Arg Glu Ala Ala Arg Lys Ser Arg Leu Arg Lys

Lys Ala Tyr Val Gln Gln Leu Glu Glu Ser Arg Leu Lys Leu Ser Gln 115 \$120\$

Leu Glu Glu Leu Glu Lys Val Lys Gln Gln Gly His Leu Gly Pro 130 135 140

Ser Gly Ser Ile Asn Thr Gly Ile Ala Ser Phe Glu Met Glu Tyr Ser 145 150 155 160

His Trp Leu Gln Glu Gln Ser Arg Arg Val Ser Glu Leu Arg Thr Ala 165 170 175 Leu Gln Ser His Ile Ser Asp Ile Glu Leu Lys Met Leu Val Glu Ser 180 $$185\$

Cys Leu Asn His Tyr Ala Asn Leu Phe Arg Met Lys Ser Asp Ala Ala 195 200 205

Lys Ala Asp Val Phe Tyr Leu Ile Ser Gly Met Trp Arg Thr Ser Thr 210 215 220

Glu Arg Phe Phe Gln Trp Ile Gly Gly Phe Arg Pro Ser Glu Leu Leu 225 230 235 240

Asn Val Val Met Pro Tyr Leu Gln Pro Leu Thr Asp Gln Gln Ile Leu 245 250 255

Glu Val Arg Asn Leu Gln Gln Ser Ser Gln Gln Ala Glu Asp Ala Leu 260 265 270

Ser Gln Gly Ile Asp Lys Leu Gln Gln Ser Leu Ala Glu Ser Ile Val 275 280 285

Ile Asp Ala Val Ile Glu Ser Thr His Tyr Pro Thr His Met Ala Ala 290 295 300

Ala Ile Glu Asn Leu Gln Ala Leu Glu Gly Phe Val Asn Gln Ala Asp 305 310 315 320

His Leu Arg Gln Gln Thr Leu Gln Gln Met Ala Lys Ile Leu Thr Thr 325 330 335

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Lys Thr Pro Glu Ile Ser Ser Met Leu Val Asn Asn Asn Glu Ala Ser 290 295 300

Phe Val Glu Glu Thr Asn Ala Ala Lys Lys Leu Lys Pro Asn Ser Asp 305 310 315 320

Glu Ser Asp Asp Leu Met Ala Tyr Leu Asp Asn Ala Leu Trp Asp Thr 325 330 335

Pro Leu Glu Val Glu Ala Met Leu Gly Ala Asp Ala Gly Ala Val Thr 340 345 350

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Asn Arg Glu Ser Ala Arg Arg Ser Arg Met Arg Lys Gln Lys His Leu 50 55 60

Asp Asp Leu Thr Ala Gln Val Thr His Leu Arg Lys Glu Asn Ala Gln 65 70 75 80

Ile Val Ala Gly Ile Ala Val Thr Thr Gln His Tyr Val Thr Ile Glu 85 90 95

Ala Glu Asn Asp Ile Leu Arg Ala Gln Val Leu Glu Leu Asn His Arg 100 105 110

Leu Gln Ser Leu Asn Glu Ile Val Asp Phe Val Glu Ser Ser Ser Ser 115 120 125

Gly Phe Gly Met Glu Thr Gly Gln Gly Leu Phe Asp Gly Gly Leu Phe 130 135 140

Asp Gly Val Met Asn Pro Met Asn Leu Gly Phe Tyr Asn Gln Pro Ile 145 150 155 160

Met Ala Ser Ala Ser Thr Ala Gly Asp Val Phe Asn Cys

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tegettgaca gagttteatg gggtegacaa etetgeteag eegacaacat eateegaaga 180
gaagccaagg agtaagaaga agaagaaaga gagagaagcg agqtacqcqt tccaqacaaq 240
aagccaggtt gatatactgg atgatggata caggtggagg aagtacggcc aaaaaqcaqt 300
caaqaacaat ccattcccca qqaqctatta taaqtqcaca qaaqaaqqat qcaqaqtqaa 360
gaagcaagtg cagaggcaat ggggagacga aggagtggtg gtgacgacat accaaqqtqt 420
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Asp Pro Arg Leu Thr Glu Phe His Gly Val Asp Asn Ser Ala Gln Pro
Thr Thr Ser Ser Glu Glu Lys Pro Arg Ser Lys Lys Lys Lys Glu
Arg Glu Ala Arg Tyr Ala Phe Gln Thr Arg Ser Gln Val Asp Ile Leu
Asp Asp Gly Tyr Arg Trp Arg Lys Tyr Gly Gln Lys Ala Val Lys Asn
Asn Pro Phe Pro Arg Ser Tyr Tyr Lys Cys Thr Glu Glu Gly Cys Arg
Val Lys Lys Gln Val Gln Arg Gln Trp Gly Asp Glu Gly Val Val Val
            100
                                105
                                                    110
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Thr Thr Tyr Gln Gly Val His Thr His Ala Val Asp Lys Pro Ser Asp

125

120

115

65

Asn Phe His His Ile Leu Thr Gln Met His Ile Phe Pro Pro Phe Cys 130 135 140 Leu Lys Glu 145 <210> 17 <211> 964 <212> DNA <213> Arabidopsis thaliana <220> <223> G28 <400> 17 gaaatctcaa caagaaccaa accaaacaac aaaaaaaacat tcttaataat tatctttctq 60 ttatgtcgat gacggcggat tctcaatctg attatgcttt tcttqaqtcc atacqacqac 120 acttactagg agaatcggag ccgatactca gtgagtcgac agcgagttcg gttactcaat 180 cttqtqtaac cqqtcaqaqc attaaaccqq tqtacqqacq aaaccctaqc tttaqcaaac 240 tqtatccttq cttcaccqaq aqctqqqqaq atttqccqtt qaaaqaaaac gattctqaqq 300 atatqttaqt ttacqqtatc ctcaacqacq cctttcacqq cqqttqqqaq ccqtcttctt 360 cqtcttccqa cqaaqatcqt aqctctttcc cqaqtqttaa qatcqaqact ccqqaqaqtt 420 tcgcggcggt ggattctgtt ccggtcaaga aggagaagac gagtcctgtt tcggcgqcqq 480 tgacggcggc gaagggaaag cattatagag gagtgagaca aaggccgtgg gggaaatttg 540 cggcggagat tagagatccg gcgaagaacg gagctagggt ttggttagga acgtttgaga 600 cggcggagga cgcggcgttg gcttacgaca gagctgcttt caggatgcgt ggttcccgcg 660 ctttqttqaa ttttccqttq aqaqttaatt caqqaqaacc cqacccqqtt cqaatcaaqt 720 ccaagagatc ttcttttct tcttctaacg agaacggagc tccgaagaag aggagaacgg 780 tggccgccgg tggtggaatg gataagggat tgacggtgaa gtgcgaggtt gttgaagtgg 840 cacqtqqcqa tcqtttattq qttttataat tttqattttt ctttqttqqa tqattatatq 900 2222 <210> 18 <211> 268 <212> PRT <213> Arabidopsis thaliana <220> <223> G28 <400> 18 Met Ser Met Thr Ala Asp Ser Gln Ser Asp Tyr Ala Phe Leu Glu Ser Ile Arg Arg His Leu Leu Gly Glu Ser Glu Pro Ile Leu Ser Glu Ser 20 Thr Ala Ser Ser Val Thr Gln Ser Cys Val Thr Gly Gln Ser Ile Lys 40 Pro Val Tyr Gly Arg Asn Pro Ser Phe Ser Lys Leu Tyr Pro Cys Phe

Thr Glu Ser Trp Gly Asp Leu Pro Leu Lys Glu Asn Asp Ser Glu Asp

70

Met Leu Val Tyr Gly Ile Leu Asn Asp Ala Phe His Gly Gly Trp Glu 85 90 95

Pro Ser Ser Ser Ser Ser Asp Glu Asp Arg Ser Ser Phe Pro Ser Val 100 $$105\$

Lys Ile Glu Thr Pro Glu Ser Phe Ala Ala Val Asp Ser Val Pro Val 115 120 125

Lys Lys Glu Lys Thr Ser Pro Val Ser Ala Ala Val Thr Ala Ala Lys 130 \$130\$

Gly Lys His Tyr Arg Gly Val Arg Gln Arg Pro Trp Gly Lys Phe Ala 145 $$ 150 $$ 155 $$ 160

Ala Glu Ile Arg Asp Pro Ala Lys Asn Gly Ala Arg Val Trp Leu Gly
165 170 175

Thr Phe Glu Thr Ala Glu Asp Ala Ala Leu Ala Tyr Asp Arg Ala Ala 180 185 190

Phe Arg Met Arg Gly Ser Arg Ala Leu Leu Asn Phe Pro Leu Arg Val

Asn Ser Gly Glu Pro Asp Pro Val Arg Ile Lys Ser Lys Arg Ser Ser 210 215 220

Phe Ser Ser Ser Asn Glu Asn Gly Ala Pro Lys Lys Arg Arg Thr Val 225 230 235 240

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Val Glu Val Ala Arg Gly Asp Arg Leu Leu Val Leu 260 265

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ttgtegeteg acciettetg ageactgica gattetigit tietetaatg etigegaaca 720 gaaagaetig gittiattat eactigatge tittiggice gaacageaat titeetitta 780 Ltaaggitag ategetitti gittaaaaaa aaaaaaaa aa

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<223> G1241

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Thr Thr Asp Asp Lys Arg Leu Gln Ser Thr Leu Lys Arg Val Gly Val 35 40 45

Asn Ser Ile Pro Ala Ile Glu Glu Val Asn Ile Phe Lys Asp Asp Val 50 55 60

Val Ile Gln Phe Ile Asn Pro Lys Val Gln Ala Ser Ile Ala Asn 65 70 75 80

Thr Trp Val Val Ser Gly Thr Pro Gln Thr Lys Lys Leu Gln Asp Ile 85 90

Leu Pro Gln Ile Ile Ser Gln Leu Gly Pro Asp Asn Leu Asp Asn Leu 100 105 110

Arg Lys Leu Ala Glu Gln Phe Gln Lys Gln Ala Pro Gly Ala Gly Asp 115 120 125

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Leu Val Val Gly Glu Thr Phe Glu Thr Pro Ala Thr Glu Glu Ala Pro 145 150 155 160

Lys Ala Ala Ala Ser 165

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20 25 30

Ala Ser Ala Ala Asp Asp Phe Trp Gly Phe Tyr Ser Thr Ser Lys Leu

His Pro Thr Asn Gln Val Asn Val Lys Glu Glu Ala Val Lys Glu 50 55 60

Gln Ala Thr Glu Pro Gly Lys Arg Arg Lys Arg Lys Asn Val Tyr Arg 65 70 75 80

Gly Ile Arg Lys Arg Pro Trp Gly Lys Trp Ala Ala Glu Ile Arg Asp 85 90 95

Pro Arg Lys Gly Val Arg Val Trp Leu Gly Thr Phe Asn Thr Ala Glu

Glu Ala Ala Met Ala Tyr Asp Val Ala Ala Lys Gln Ile Arg Gly Asp 115 120 125

Lys Ala Lys Leu Asn Phe Pro Asp Leu His His Pro Pro Pro Pro Asn 130 135 140

Tyr Thr Pro Pro Pro Ser Ser Pro Arg Ser Thr Asp Gln Pro Pro Ala 145 150 155 160 Lys Lys Val Cys Val Val Ser Gln Ser Glu Ser Glu Leu Ser Gln Pro\$165\$

Ser Phe Pro Val Glu Cys Ile Gly Phe Gly Asn Gly Asp Glu Phe Gln 180 $$185\$

Asn Leu Ser Tyr Gly Phe Glu Pro Asp Tyr Asp Leu Lys Gln Gln Ile 195 200 205

Ser Ser Leu Glu Ser Phe Leu Glu Leu Asp Gly Asn Thr Ala Glu Gln 210 $$ 220 $$

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<212> DNA

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Ser Lys Pro Cys Pro Val Ser Ile Ile Pro Glu Val Asp Ile Tyr Lys 35 40 45

Phe Asp Pro Trp Gln Leu Pro Glu Lys Thr Glu Phe Gly Glu Asn Glu 50 55 60

Trp Tyr Phe Phe Ser Pro Arg Glu Arg Lys Tyr Pro Asn Gly Val Arg 65 70 75 80

Pro Asn Arg Ala Ala Val Ser Gly Tyr Trp Lys Ala Thr Gly Thr Asp 85 90 95

Lys Ala Ile His Ser Gly Ser Ser Asn Val Gly Val Lys Lys Ala Leu 100 105 110

Val Phe Tyr Lys Gly Arg Pro Pro Lys Gly Ile Lys Thr Asp Trp Ile 115 120 125

Met His Glu Tyr Arg Leu His Asp Ser Arg Lys Ala Ser Thr Lys Arg 130 135 140

Ser Gly Ser Met Arg Leu Asp Glu Trp Val Leu Cys Arg Ile Tyr Lys 145 150 150 155

Lys Arg Gly Ala Ser Lys Leu Leu Asn Glu Glu Glu Gly Phe Met Asp 165 170 175

Glu Val Leu Met Glu Asp Glu Thr Lys Val Val Ile As
n Glu Ala Glu 180 185 190

Arg Arg Asn Asp Glu Glu Ile Met Met Met Thr Ser Met Lys Leu Pro 195 200 205

Arg Thr Cys Ser Leu Ala His Leu Leu Glu Met Asp Tyr Met Gly Pro 210 215 220

Val Ser His Ile Asp Asn Phe Ser Gln Phe Asp His Leu His Gln Pro 225 230 235 240

Asp Ser Glu Ser Ser Trp Phe Gly Asp Leu Gln Phe Asn Gln Asp Glu 245 250 255

Ile Leu Asn His His Arg Gln Ala Met Phe Lys Phe 260 265

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<223> G263

<400> 25

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<213> Arabidopsis thaliana

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<400> 26

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Ser Trp Asn Glu Glu Gly Thr Ala Phe Val Val Trp Lys Thr Ala Glu 35 40 45

Phe Ala Lys Asp Leu Leu Pro Gln Tyr Phe Lys His Asn Asn Phe Ser 50 55 60

Ser Phe Ile Arg Gln Leu Asn Thr Tyr Gly Phe Arg Lys Thr Val Pro 65 70 75 80

Asp Lys Trp Glu Phe Ala Asn Asp Tyr Phe Arg Arg Gly Gly Glu Asp 85 90 95

Leu Leu Thr Asp Ile Arg Arg Lys Ser Val Ile Ala Ser Thr Ala 100 105 110

Gly Lys Cys Val Val Val Gly Ser Pro Ser Glu Ser Asn Ser Gly Gly 115 120 125

Gly Asp Asp His Gly Ser Ser Ser Thr Ser Ser Pro Gly Ser Ser Lys 130 135 140 Asn Pro Gly Ser Val Glu Asn Met Val Ala Asp Leu Ser Gly Glu Asn 145 155 160

Glu Lys Leu Lys Arg Glu Asn Asn Asn Leu Ser Ser Glu Leu Ala Ala

Ala Lys Lys Gln Arg Asp Glu Leu Val Thr Phe Leu Thr Gly His Leu 180 185 190

Lys Val Arg Pro Glu Gln Ile Asp Lys Met Ile Lys Gly Gly Lys Phe 195 200 205

Lys Pro Val Glu Ser Asp Glu Glu Ser Glu Cys Glu Gly Cys Asp Gly 210 215 220

Gly Gly Gly Ala Glu Glu Gly Val Gly Glu Gly Leu Lys Leu Phe Gly 225 230 235

Val Trp Leu Lys Gly Glu Arg Lys Lys Arg Asp Arg Asp Glu Lys Asn 245 250 255

Tyr Val Val Ser Gly Ser Arg Met Thr Glu Ile Lys Asn Val Asp Phe 260 265 270

His Ala Pro Leu Trp Lys Ser Ser Lys Val Cys Asn 275 280

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<220>

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Ile Gly Val Thr Arg Met Arg Val Glu Glu Asp Pro Pro Thr Ser Ala 20 25 30

Leu Val Glu Glu Leu Asn Arg Val Ser Ala Glu Asn Lys Lys Leu Ser 35 40 45

Glu Met Leu Thr Leu Met Cys Asp Asn Tyr Asn Val Leu Arg Lys Gln
50 55 60

Leu Met Glu Tyr Val Asn Lys Ser Asn Ile Thr Glu Arg Asp Gln Ile 65 70 75 80

Ser Pro Pro Lys Lys Arg Lys Ser Pro Ala Arg Glu Asp Ala Phe Ser 85 90 95

Cys Ala Val Ile Gly Gly Val Ser Glu Ser Ser Ser Thr Asp Gln Asp $100 \hspace{1.5cm} 105 \hspace{1.5cm} 110 \hspace{1.5cm}$

Glu Tyr Leu Cys Lys Lys Gln Arg Glu Glu Thr Val Val Lys Glu Lys 115 120 125

Val Ser Arg Val Tyr Tyr Lys Thr Glu Ala Ser Asp Thr Thr Leu Val

Val Lys Asp Gly Tyr Gln Trp Arg Lys Tyr Gly Gln Lys Val Thr Arg 145 \$150\$

Asp Asn Pro Ser Pro Arg Ala Tyr Phe Lys Cys Ala Cys Ala Pro Ser 165 170 175

Cys Ser Val Lys Lys Lys Val Gln Arg Ser Val Glu Asp Gln Ser Val 180 185 190

Leu Val Ala Thr Tyr Glu Gly Glu His Asn His Pro Met Pro Ser Gln 195 200 205

Ile Asp Ser Asn Asn Gly Leu Asn Arg His Ile Ser His Gly Gly Ser 210 215 220

Ala Ser Thr Pro Val Ala Ala Asn Arg Arg Ser Ser Leu Thr Val Pro 225 230 235

Val Thr Thr Val Asp Met Ile Glu Ser Lys Lys Val Thr Ser Pro Thr 245 250 255

Ser Arg Ile Asp Phe Pro Gln Val Gln Lys Leu Val Glu Gln Met 260 265 Leu Leu Val Glu Gln Met

Ala Ser Ser Leu Thr Lys Asp Pro Asn Phe Thr Ala Ala Leu Ala Ala 275 280 285

Ala Val Thr Gly Lys Leu Tyr Gln Gln Asn His Thr Glu Lys 290 295 300

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<211> 748

<212> DNA

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gccattgctt ctgccgacaa ccaaaacaag aaagaaaga aaaaaatta agggagagtt 360
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gggagagaaga cggtgaacaa caagaaacaag aacaagaatag actcaaatg ttcagtgat 480
gggaagaagaa tggtgaagaa aggccacat ccaagaact actacaaatg ttcagtgat 480
ggttcccc tgaagaaaag ggttgaacga gacagaaga actcagaacta tcactagagg cttcacacaa tcactacaagg gttccacaa tcactacaaga actcacaaca tagactacag 660
ttctagttct ttatatccat tgtaaactgg ttgcaggttc acaaatttt gagagtttat 720
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<211> 173

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<213> Arabidopsis thaliana

<220>

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His Ser Val Phe Glu Phe Pro Glu Leu Asp Leu Ser Asp Glu Trp Met 20 25 30

Asp Asp Asp Leu Val Ser Ala Val Ser Gly Met Asn Gln Ser Tyr Gly
35 40 45

Tyr Gln Thr Ser Asp Val Ala Gly Ala Leu Phe Ser Gly Ser Ser Ser 50 55 60

Cys Phe Ser His Pro Glu Ser Pro Ser Thr Lys Thr Tyr Val Ala Ala 65 70 75 80

Thr Ala Thr Ala Ser Ala Asp Asn Gln Asn Lys Lys Glu Lys Lys Lys
85 90 95

Ile Lys Gly Arg Val Ala Phe Lys Thr Arg Ser Glu Val Glu Val Leu \$100\$ 105 110

Asp Asp Gly Phe Lys Trp Arg Lys Tyr Gly Lys Lys Met Val Lys Asn 115 120 125

Ser Pro His Pro Arg Asn Tyr Tyr Lys Cys Ser Val Asp Gly Cys Pro 130 135 140

Val Lys Lys Arg Val Glu Arg Asp Arg Asp Asp Pro Ser Phe Val Ile 145 $$150\$

Thr Thr Tyr Glu Gly Ser His Asn His Ser Ser Met Asn 165 170

<210> 31

<211> 1195

<212> DNA

<213> Arabidopsis thaliana

<220>

<223> G242

<400> 31

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<212> PRT

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<220> <223> G242

<400> 32

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Leu Arg Arg Leu Val Val Lys Tyr Gly Pro Arg Asn Trp Thr Val Ile 20 25 30

Ser Lys Ser Ile Pro Gly Arg Ser Gly Lys Ser Cys Arg Leu Arg Trp 35 40 45

Cys Asn Gln Leu Ser Pro Gln Val Glu His Arg Pro Phe Ser Ala Glu 50 55 60

Glu Asp Glu Thr Ile Ala Arg Ala His Ala Gln Phe Gly Asn Lys Trp 65 70 75 80

Ala Thr Ile Ala Arg Leu Leu Asn Gly Arg Thr Asp Asn Ala Val Lys 85 90 95

Asn His Trp Asn Ser Thr Leu Lys Arg Lys Cys Gly Gly Tyr Asp His 100 105 110

Arg Gly Tyr Asp Gly Ser Glu Asp His Arg Pro Val Lys Arg Ser Val 115 120 125

Ser Ala Gly Ser Pro Pro Val Val Thr Gly Leu Tyr Met Ser Pro Gly 130 135 140

Ser Pro Thr Gly Ser Asp Val Ser Asp Ser Ser Thr Ile Pro Ile Leu 145 $$ 150 $$ 150 $$ 155 $$ 160

Pro Ser Val Glu Leu Phe Lys Pro Val Pro Arg Pro Gly Ala Val Val 165 170 175

Leu Pro Leu Pro Ile Glu Thr Ser Ser Phe Ser Asp Asp Pro Pro Thr 180 185 190

Ser Leu Ser Leu Ser Leu Pro Gly Ala Asp Val Ser Glu Glu Ser Asp

Arg Ser His Glu Ser Thr Asn Ile Asn Asn Thr Thr Ser Ser Arg His

Asn His Asn Asn Thr Val Ser Phe Met Pro Phe Ser Gly Gly Phe Arg 225 230 235 240

Gly Ala Ile Glu Glu Met Gly Lys Ser Phe Pro Gly Asn Gly Glu Glu 245 250 250 255

Phe Met Ala Val Val Glu Glu Met Ile Lys Ala Glu Val Arg Ser Tyr 260 265 270

Met Thr Glu Met Gln Arg Asn Asn Gly Gly Gly Phe Val Gly Gly Phe 275 280 285

65

70

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913

a۸

Phe Asp Phe Pro Ala Val Lys Val Glu Pro Thr Glu Asn Phe Thr Ala 85 90 95

Met Glu Glu Lys Pro Lys Lys Ala Ile Pro Val Thr Glu Thr Ala Val

Lys Ala Lys His Tyr Arg Gly Val Arg Gln Arg Pro Trp Gly Lys Phe 115 120 125

Gly Thr Phe Glu Thr Ala Glu Asp Ala Ala Leu Ala Tyr Asp Ile Ala 145 \$150\$

Ala Phe Arg Met Arg Gly Ser Arg Ala Leu Leu Asn Phe Pro Leu Arg 165 170 175

Val Asn Ser Gly Glu Pro Asp Pro Val Arg Ile Thr Ser Lys Arg Ser 180 185 190

Gly Lys Leu Lys Arg Arg Arg Lys Ala Glu Asn Leu Thr Ser Glu Val 210 215 220

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<212> PRT <213> Arabidopsis thaliana

<220>

<223> G1049

<400> 36

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Ser Ile Leu Gln Ser Pro Tyr Pro Ser Asn Phe Pro Ile Ser Thr Pro 20 25 30

Phe Pro Thr Asn Gly Gln Asn Pro Tyr Leu Leu Tyr Gly Phe Gln Ser 35 40 45

Pro Thr Asn Asn Pro Gln Ser Met Ser Leu Ser Ser Asn Asn Ser Thr 50 55 60

Ser Asp Glu Ala Glu Glu Gln Gln Thr Asn Asn Asn Ile Ile Asn Glu 65 70 75 80

Arg Lys Gln Arg Arg Met Ile Ser Asn Arg Glu Ser Ala Arg Arg Ser 85 90 95

Arg Met Arg Lys Gln Arg His Leu Asp Glu Leu Trp Ser Gln Val Met 100 105 110

Trp Leu Arg Ile Glu Asn His Gln Leu Leu Asp Lys Leu Asn Asn Leu 115 120 125

Ser Glu Ser His Asp Lys Val Leu Gln Glu Asn Ala Gln Leu Lys Glu 130 140

Glu Thr Phe Glu Leu Lys Gln Val Ile Ser Asp Met Gln Ile Gln Ser 145 $$ 150 $$ 155 $$ 160

Pro Phe Ser Cys Phe Arg Asp Asp Ile Ile Pro Ile Glu 165 170

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Asp Glu Glu Leu Val Met His Tyr Leu Cys Arg Lys Cys Ala Ser Gln \$20\$

Ser Ile Ala Val Pro Ile Ile Ala Glu Ile Asp Leu Tyr Lys Tyr Asp $35 \hspace{1cm} 40 \hspace{1cm} 45$

Pro Trp Glu Leu Pro Gly Leu Ala Leu Tyr Gly Glu Lys Glu Trp Tyr $50 \hspace{1cm} 55 \hspace{1cm} 60 \hspace{1cm}$

Phe Phe Ser Pro Arg Asp Arg Lys Tyr Pro Asn Gly Ser Arg Pro Asn 65 70 75 80

Arg Ser Ala Gly Ser Gly Tyr Trp Lys Ala Thr Gly Ala Asp Lys Pro 85 90 95

Ile Gly Leu Pro Lys Pro Val Gly Ile Lys Lys Ala Leu Val Phe Tyr 100 105 110

Ala Gly Lys Ala Pro Lys Gly Glu Lys Thr Asn Trp Ile Met His Glu 115 120 125

Tyr Arg Leu Ala Asp Val Asp Arg Ser Val Arg Lys Lys Lys Asn Ser 130 135 140

Leu Arg Leu Asp Asp Trp Val Leu Cys Arg Ile Tyr Asn Lys Lys Gly 145 150 155 160 Ala Thr Glu Arg Arg Gly Pro Pro Pro Pro Val Val Tyr Gly Asp Glu 165 170 175

Ile Met Glu Glu Lys Pro Lys Val Thr Glu Met Val Met Pro Pro Pro 180 185 190

Pro Gln Gln Thr Ser Glu Phe Ala Tyr Phe Asp Thr Ser Asp Ser Val

Pro Lys Leu His Thr Thr Asp Ser Ser Cys Ser Glu Gln Val Val Ser 210 $$ 215 $$ 220

Pro Glu Phe Thr Ser Glu Val Gln Ser Glu Pro Lys Trp Lys Asp Trp 225 230 235

Ser Ala Val Ser Asn Asn Asn Asn Asn Thr Leu Asp Phe Gly Phe Asn 245 250 255

Tyr Ile Asp Ala Thr Val Asp Asn Ala Phe Gly Gly Gly Ser Ser 260 265 270

Asn Gln Met Phe Pro Leu Gln Asp Met Phe Met Tyr Met Gln Lys Pro 275 280 285

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Ser Phe Leu Arg Leu Trp Gln His Glu Thr Val Leu Tyr Gly Gln 305 310 315

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<212> DNA

<213> Arabidopsis thaliana

<220> <223> G239

<400> 39

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<220>

<223> G23

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Asp Ser Asp Val Arg Lys Gly Pro Trp Thr Glu Glu Glu Asp Ala Ile
20 25 30

Leu Val Asn Phe Val Ser Ile His Gly Asp Ala Arg Trp Asn His Ile 35 40 45

Ala Arg Ser Ser Gly Leu Lys Arg Thr Gly Lys Ser Cys Arg Leu Arg 50 55 60

Trp Leu Asn Tyr Leu Arg Pro Asp Val Arg Arg Gly Asn Ile Thr Leu 65 70 75 80

Glu Glu Gln Phe Met Ile Leu Lys Leu His Ser Leu Trp Gly Asn Arg \$85\$ 90 95

Trp Ser Lys Ile Ala Gln Tyr Leu Pro Gly Arg Thr Asp Asn Glu Ile 100 105 110

Lys Asn Tyr Trp Arg Thr Arg Val Gln Lys Gln Ala Lys His Leu Arg

Cys Asp Val Asn Ser Asn Leu Phe Lys Glu Thr Met Arg Asn Val Trp

Met Pro Arg Leu Val Glu Arg Ile Asn Ala Gln Ser Leu Pro Thr Thr 145 150 150 160

Cys Glu Gln Val Glu Ser Met Ile Thr Asp Pro Ser Gln Pro Val Asn 165 170 175

Glu Pro Ser Pro Val Glu Pro Gly Phe Val Gln Phe Ser Gln Asn His 180 185 190

His Gln Gln Phe Val Pro Ala Thr Glu Leu Ser Ala Thr Ser Ser Asn 195 200 205

Ser Pro Ala Glu Thr Phe Ser Asp Val Arg Gly Gly Val Val Asn Gly 210 215 220

Ser Gly Tyr Asp Pro Ser Gly Gln Thr Gly Phe Gly Glu Phe Asn Asp

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Asn

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<210> 42 <211> 330

<212> PRT

<213> Arabidopsis thaliana

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Ser Asp Ser Ser Asp Arg Ser Lys Ser Lys Met Asp Gln Lys Thr Leu 35 40 45

Arg Arg Leu Ala Gln Asn Arg Glu Ala Ala Arg Lys Ser Arg Leu Arg 50 55 60

Lys Lys Ala Tyr Val Gln Gln Leu Glu Asn Ser Arg Leu Lys Leu Thr 65 70 75 80

Gln Leu Glu Glu Glu Leu Gln Arg Ala Arg Gln Gln Gly Val Phe Ile 85 90 95

Ser Ser Ser Gly Asp Gln Ala His Ser Thr Ala Gly Asp Gly Ala Met

Ala Phe Asp Val Glu Tyr Arg Arg Trp Gln Glu Asp Lys Asn Arg Gln 115 120 125

Met Lys Glu Leu Ser Ser Ala Ile Asp Ser His Ala Thr Asp Ser Glu 130 135 140

Leu Arg Ile Ile Val Asp Gly Val Ile Ala His Tyr Glu Glu Leu Tyr 145 150 155 160

Arg Ile Lys Gly Asn Ala Ala Lys Ser Asp Val Phe His Leu Leu Ser 165. 170 175

Gly Met Trp Lys Thr Pro Ala Glu Arg Cys Phe Leu Trp Leu Gly Gly 180 185 190

Phe Arg Ser Ser Glu Leu Leu Lys Leu Ile Ala Cys Gln Leu Glu Pro 195 200 205 Leu Thr Glu Gln Gln Ser Leu Asp Ile Asn Asn Leu Gln Gln Ser Thr

210 215 220

Gln Gln Ala Glu Asp Ala Leu Ser Gln Gly Met Asp Asn Leu Gln Gln
225 230 235 240

Ser Leu Ala Asp Thr Leu Ser Ser Gly Thr Leu Gly Ser Ser Ser Ser 250

Gly Asn Val Ala Ser Tyr Met Gly Gln Met Ala Met Ala Met Gly Lys 260 265 270

Leu Gly Thr Leu Glu Gly Phe Ile Arg Gln Ala Asp Asn Leu Arg Leu 275 280 285

Gln Thr Tyr Gln Gln Met Val Arg Leu Leu Thr Thr Arg Gln Ser Ala 290 295 300 Arg Ala Leu Leu Ala Val His Asn Tyr Thr Leu Arg Leu Arg Ala Leu 305 310 315 320

Ser Ser Leu Trp Leu Ala Arg Pro Arg Glu 325 330

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<212> PRT

<213> Arabidopsis thaliana

<220>

<223> G352

-400 - 44

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Pro Leu Leu Arg Tyr Arg Glu Glu Met Glu Pro Glu Asn Leu Glu Gln
20 25 30

Trp Ala Lys Arg Lys Arg Thr Lys Arg Gln Arg Phe Asp His Gly His $35 \hspace{1cm} 40 \hspace{1cm} 45$

Gln Asn Gln Glu Thr Asn Lys Asn Leu Pro Ser Glu Glu Glu Tyr Leu 50 55 60

Ala Leu Cys Leu Leu Met Leu Ala Arg Gly Ser Ala Val Gln Ser Pro 65 70 75 80

Pro Leu Pro Pro Leu Pro Ser Arg Ala Ser Pro Ser Asp His Arg Asp 85 90 95

Tyr Lys Cys Thr Val Cys Gly Lys Ser Phe Ser Ser Tyr Gln Ala Leu $100 \hspace{1.5cm} 105 \hspace{1.5cm} 105 \hspace{1.5cm} 110 \hspace{1.5cm}$

Gly Gly His Lys Thr Ser His Arg Lys Pro Thr Asn Thr Ser Ile Thr 115 120 125

Ser Gly Asn Gln Glu Leu Ser Asn Asn Ser His Ser Asn Ser Gly Ser 130 135 140

Val Val Ile Asn Val Thr Val Asn Thr Gly Asn Gly Val Ser Gln Ser 145 \$150\$

Gly Lys Ile His Thr Cys Ser Ile Cys Phe Lys Ser Phe Ala Ser Gly
165 170 175

Gln Ala Leu Gly Gly His Lys Arg Cys His Tyr Asp Gly Gly Asn Asn 180 185 190

Gly Asn Gly Asn Gly Ser Ser Ser Asn Ser Val Glu Leu Val Ala Gly 195 200 205

Ser Asp Val Ser Asp Val Asp Asn Glu Arg Trp Ser Glu Glu Ser Ala 210 215 220

Ile Gly Gly His Arg Gly Phe Asp Leu Asn Leu Pro Ala Asp Gln Val 225 230230235

Ser Val Thr Thr Ser 245

<210> 45 <211> 1001

<212> DNA

<213> Arabidopsis thaliana

<220> <223> G1352

<400> 45

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<400> 46

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1 5 10 15

Glu Thr Lys Glu Asp Leu Met Asn Asp Ala Val Phe Ile Glu Pro Trp 20 25 30

Leu Lys Arg Lys Arg Ser Lys Arg Gln Arg Ser His Ser Pro Ser Ser 35 40 45

Ser Ser Ser Ser Pro Pro Arg Ser Arg Pro Lys Ser Gln Asn Gln Asp 50 55 60

Leu Thr Glu Glu Glu Tyr Leu Ala Leu Cys Leu Leu Met Leu Ala Lys 65 70 75 80

Asp Gln Pro Ser Gln Thr Arg Phe His Gln Gln Ser Gln Ser Leu Thr 85 90 95

Pro Pro Pro Glu Ser Lys Asn Leu Pro Tyr Lys Cys Asn Val Cys Glu 100 $$100\,$

Lys Ala Phe Pro Ser Tyr Gln Ala Leu Gly Gly His Lys Ala Ser His 115 120 125

Arg Ile Lys Pro Pro Thr Val Ile Ser Thr Thr Ala Asp Asp Ser Thr 130 135 140

Ala Pro Thr Ile Ser Ile Val Ala Gly Glu Lys His Pro Ile Ala Ala 145 $$ 150 $$ 155 $$ 160

Ser Gly Lys Ile His Glu Cys Ser Ile Cys His Lys Val Phe Pro Thr 165 170 175

Gly Gln Ala Leu Gly Gly His Lys Arg Cys His Tyr Glu Gly Asn Leu 180 185 190

Gly Gly Gly Gly Gly Gly Ser Lys Ser Ile Ser His Ser Gly Ser 195 200 205

Val Ser Ser Thr Val Ser Glu Glu Arg Ser His Arg Gly Phe Ile Asp 210 215 220

Leu Asn Leu Pro Ala Leu Pro Glu Leu Ser Leu His His Asn Pro Ile 225 230 235 240

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Gly Ala Ala Leu Ser Asp Tyr Ser His Gly Glu Phe Leu Val Ser Asn 50 55 60

His Ser Ser Ser Ser Ala Ala Ala Ala Ile Ala Ser Thr Ser Ser Leu 65 70 75 80

Pro Thr Ala Ile Ser Pro Pro Leu Pro Ser Ser Thr Ala Pro Val Ser 85 90 95

Asn Ser Thr Ala Ser Ser Ser Ser Ala Ala Val Pro Gln Pro Ile Pro 100 100 105 110

Asp Thr Leu Pro Pro Pro Pro Pro Pro Pro Pro Leu Pro Leu Gln Arg 115 120 125

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Gly Ser Gly Leu Asn Gly Ile Glu Glu Asp Gly Ala Leu Asp Asn Asp 145 150 155 160

Asp Asp Asp Asp Asp Asp Asp Asp Ser Glu Met Glu Asn Arg Asp 165 170 175

Arg Leu Ile Arg Lys Ser Arg Ser Arg Gly Gly Ser Thr Arg Gly Asn 180 185 190

Arg Thr Thr Ile Glu Asp His His Leu Gln Glu Glu Lys Ala Pro Pro 195 200 205

Pro Pro Pro Leu Ala Asn Ser Arg Pro Ile Pro Pro Pro Arg Gln His 210 215 220

Gln His Gln His Gln Gln Gln Gln Gln Gln Pro Phe Tyr Asp Tyr Phe 225 $$ 230 $$ 235 $$ 240

Phe Pro Asn Val Glu Asn Met Pro Gly Thr Thr Leu Glu Asp Thr Pro 245 250 255

Pro Gln Pro Gln Pro Gln Pro Thr Arg Pro Val Pro Pro Gln Pro His

Ser Pro Val Val Thr Glu Asp Asp Glu Asp Glu Glu Glu Glu Glu Glu Glu 275 280 285

Glu Glu Glu Glu Glu Glu Thr Val Ile Glu Arg Lys Pro Leu Val 290 295 300

Glu Glu Arg Pro Lys Arg Val Glu Glu Val Thr Ile Glu Leu Glu Lys 305 310 315 320

Val Thr Asn Leu Arg Gly Met Lys Lys Ser Lys Gly Ile Gly Ile Pro 325 330 335

Gly Glu Arg Arg Gly Met Arg Met Pro Val Thr Ala Thr His Leu Ala 340 345 350

Asn Val Phe Ile Glu Leu Asp Asp Asn Phe Leu Lys Ala Ser Glu Ser 355 360

Ala His Asp Val Ser Lys Met Leu Glu Ala Thr Arg Leu His Tyr His 370 375 380

Ser Asn Phe Ala Asp Asn Arg Gly His Ile Asp His Ser Ala Arg Val 385 390 395 400

Met Arg Vai Ile Thr Trp Asn Arg Ser Phe Arg Gly Ile Pro Asn Ala 405 410 415

Asp Asp Gly Lys Asp Asp Val Asp Leu Glu Glu Asn Glu Thr His Ala 420 425 430

Thr Val Leu Asp Lys Leu Leu Ala Trp Glu Lys Lys Leu Tyr Asp Glu 435 $$ 440 $$ 445

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His Leu Asn Arg Val Lys Lys Arg Gly Gly His Ser Asp Ser Leu Glu 465 470 475 480

Arg Ala Lys Ala Ala Val Ser His Leu His Thr Arg Tyr Ile Val Asp 485 490 495

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Thr Leu Lys Glu Lys Val Ser Ser Pro Pro Arg Val Pro Asn Pro Ala 610 615 620

Ile Gln Lys Leu Leu His Ala Trp Tyr Asp Arg Leu Asp Lys Ile Pro 625 630 635

Asp Glu Met Ala Lys Ser Ala Ile Ile Asn Phe Ala Ala Val Val Ser 645 650 655

Thr Ile Met Gln Gln Gln Glu Asp Glu Ile Ser Leu Arg Asn Lys Cys 660 665 670

Glu Glu Thr Arg Lys Glu Leu Gly Arg Lys Ile Arg Gln Phe Glu Asp 675 680 685

Trp Tyr His Lys Tyr Ile Gln Lys Arg Gly Pro Glu Gly Met Asn Pro 690 695 700

Asp Glu Ala Asp Asn Asp His Asn Asp Glu Val Ala Val Arg Gln Phe 705 710 715 720

Asn Val Glu Glu Ile Lys Lys Arg Leu Glu Glu Glu Glu Glu Ala Tyr 725 $$ 730 $$ 735

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Thr Arg Leu Pro Glu Leu Phe Gln Ala Met Ser Glu Val Ala Tyr Ser 755 760 765

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Ser Pro Phe Lys Ser Asp Ile Asn Asn Ile Thr Ser Asn Gln Asn Asn 35 40 45

Asn Gln Ser Ser Ser Thr Thr Leu Glu Val Asp Ala Arg Pro Glu Ala 50 60

Asp Asp Asn Asn Arg Val Asn Tyr Thr Ser Val Tyr Asn Asn Ser Leu 65 70 75 80

Glu Ala Glu Pro Ser Ser Asn Asn Asp Gln Asp Glu Asp Arg Ile Asn 85 90 95 Asp Lys Met Lys Arg Arg Leu Ala Gln Asn Arg Glu Ala Ala Arg Lys 100 105 110

Ser Arg Leu Arg Lys Lys Ala His Val Gln Gln Leu Glu Glu Ser Arg 115 120 125

Leu Lys Leu Ser Gln Leu Glu Gln Glu Leu Val Arg Ala Arg Gln Gln 130 135 140

Gly Leu Cys Val Arg Asn Ser Ser Asp Thr Ser Tyr Leu Gly Pro Ala 145 150 155 160

Gly Asn Met Asn Ser Gly Ile Ala Ala Phe Glu Met Glu Tyr Thr His 165 170 175

Trp Leu Glu Gln Asn Arg Arg Val Ser Glu Ile Arg Thr Ala Leu 180 185 190

Gln Ala His Ile Gly Asp Ile Glu Leu Lys Met Leu Val Asp Ser Cys 195 200 205

Leu Asn His Tyr Ala Asn Leu Phe Arg Met Lys Ala Asp Ala Ala Lys 210 215 220

Ala Asp Val Phe Phe Leu Met Ser Gly Met Trp Arg Thr Ser Thr Glu 225 230 235 240

Arg Phe Phe Gln Trp Ile Gly Gly Phe Arg Pro Ser Glu Leu Leu Asn \$245\$ \$250\$

Val Val Met Pro Tyr Val Glu Pro Leu Thr Asp Gln Gln Leu Leu Glu 260 265 270

Val Arg Asn Leu Gln Gln Ser Ser Gln Gln Ala Glu Glu Ala Leu Ser 275 280 285

Gln Gly Leu Asp Lys Leu Gln Gln Gly Leu Val Glu Ser Ile Ala Ile 290 295 300

Gln Ile Lys Val Val Glu Ser Val Asn His Gly Ala Pro Met Ala Ser 305 310 315 320

Ala Met Glu Asn Leu Gln Ala Leu Glu Ser Phe Val Asn Gln Ala Asp 325 330 335

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Gly Ile Val Thr Lys Pro Phe Thr Lys Gln Glu Asn Thr Val Val Gln 100 105 110

Thr Cys Ala Val Ala Cys Tyr Ser Ile Ala Val Gly Gly Gly Phe Gly 115 120 125

Ser Tyr Leu Leu Gly Leu Asn Arg Ile Thr Tyr Glu Gln Ser Gly Gly 130 140

Thr His Thr Asp Gly Asn Tyr Pro Glu Gly Thr Lys Glu Pro Gly Ile 145 150 155 160

Gly Trp Met Thr Ala Phe Leu Phe Phe Thr Cys Phe Val Gly Leu Leu 165 170 175

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Pro Lys Gly Asn Lys Met Ala Lys Lys Gln Val Phe Gly Phe Val Lys 210 220

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Ala Leu Lys Asn Thr Phe Tyr Phe Asp Phe Ser Met Thr Tyr Val Gly 260 265 270

Ala Gly Met Ile Cys Pro His Ile Val Asn Ile Ser Leu Leu Phe Gly
275 280 · 285

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Asn Gly Tyr Lys Val Phe Ile Ser Ile Ser Leu Ile Leu Gly Asp Gly 325 330 335

Leu Tyr Gln Phe Ile Lys Ile Leu Phe Lys Thr Gly Ile Asn Met Tyr $340 \hspace{1.5cm} 345 \hspace{1.5cm} 350$

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Val Ser Ile Ile Ala Ile Pro Ile Met Phe Pro Glu Leu Lys Trp Tyr 405 410 415

Phe Ile Val Val Ala Tyr Met Leu Ala Pro Ser Leu Gly Phe Ser Asn 420 425 430

Ala Tyr Gly Ala Gly Leu Thr Asp Met Asn Met Ala Tyr Asn Tyr Gly
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Lys Val Ala Leu Phe Ile Leu Ala Ala Met Ala Gly Lys Gln Asn Gly 450 455 460

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Gly Cys Val Val Ala Pro Leu Thr Phe Phe Leu Phe Tyr Lys Ala Phe 515 520 525

Asp Val Gly Asn Gln Glu Gly Glu Tyr Lys Ala Pro Tyr Ala Leu Val 530 535 540

Tyr Arg Asn Met Ala Ile Leu Gly Val Glu Gly Phe Ser Ala Leu Pro 545 550 555 556

Gln His Cys Leu Gln Leu Cys Tyr Gly Phe Phe Ala Phe Ala Val Ala 565 570 575

Ala Asn Leu Val Arg Asp Arg Leu Pro Asp Lys Ile Gly Asn Trp Val 580 585 590

Pro Leu Pro Met Ala Met Ala Val Pro Phe Leu Val Gly Gly Tyr Phe 595 600 605

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His Asn Lys Ser Gln Val Thr Met Glu Glu Val Trp Lys Glu Ile Asn 35 40 45

Leu Gly Ser Leu His Tyr His Arg Gln Leu Asn Ile Gly His Glu Pro $50 \hspace{1cm} 55 \hspace{1cm} 60 \hspace{1cm}$

Met Leu Lys Asn Gln Asn Pro Asn Asn Ser Ile Phe Gln Asp Phe Leu 65 70 75 80

Asn Met Pro Leu Asn Gln Pro Pro Pro Pro Pro Pro Pro Pro Pro Ser Ser 85 90 95

Ser Thr Ile Val Thr Ala Leu Tyr Gly Ser Leu Pro Leu Pro Pro Pro 100 100 105 110

Ala Thr Val Leu Ser Leu Asn Ser Gly Val Gly Phe Glu Phe Leu Asp 115 120 125

Thr Thr Glu Asn Leu Leu Ala Ser Asn Pro Arg Ser Phe Glu Glu Ser 130 $$ 135 $$ 140

Ala Lys Phe Gly Cys Leu Gly Lys Lys Arg Gly Gln Asp Ser Asp Asp 145 150 155 160

Thr Arg Gly Asp Arg Arg Tyr Lys Arg Met Ile Lys Asn Arg Glu Ser 165 170 175

Ala Ala Arg Ser Arg Ala Arg Lys Gln Ala Tyr Thr Asn Glu Leu Glu 180 185 190

Leu Glu Ile Ala His Leu Gln Thr Glu Asn Ala Arg Leu Lys Ile Gln 195 200 205

Gln Glu Gln Leu Lys Ile Ala Glu Ala Thr Gln Asn Gln Val Lys Lys 210 215 220

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Asp Ala Gly Asp Asp Phe Ile Val Gly Asp Cys Leu Val Tyr Glu Asp 50 55 60

Gly Val Phe Glu Asp Pro Tyr Leu Asp Lys Glu Val Thr Gln Val Ala 65 70 75 80

Lys Gln Glu Arg Lys Lys Asn Arg Arg Gly Gly Ala Lys Arg Leu Asp 85 90 95

Glu Ser Glu Ile Glu Pro Glu Asn Leu Val Pro Glu Glu Trp Arg Asp 100 105 110

Ile Gln Ala Glu Val Asn Leu Thr Lys Lys Asp Lys Arg Lys Ile Ala 115 120 125

Gln Glu Met Glu Phe Gly Val Arg Val Glu Lys Lys Arg Gln Gly Leu 130 135 140 Ile Pro Leu Arg Lys Val Asp Leu Asn Asp Phe Leu Thr Tyr Lys Glu 145 $$ 150 $$ 155 $$ 160

Ala Lys Leu Ala Gln Leu Arg Pro Val Ile Leu Asp Lys Pro Gly Asn 165 170 175

Phe Ser Asp Asp Ser Gly Ala Ser Ser Asp Gly Glu Thr Ala Val Ser 180 185 190

Ser Pro Ser Glu Arg Val Ala Pro Lys Asn Pro Arg Trp Ala Val Tyr 195 200 205

Gly Lys Gly Phe Asp His Val Ala Lys Phe Phe Asn Ser Asp Lys Tyr 210 215 220

Asp Pro Ser Asp Lys Lys Ser Asp Gly Pro Arg Lys Leu Leu Ser Lys 225 230 235

Glu Glu Lys Phe Met Leu Asn Ser Arg Asn Pro Asp Leu Ala Val Ala 245 250 255

Thr Ser Lys Lys Trp Leu Pro Leu His Thr Leu Ala Ala Cys Gly Glu 260 265 270

Phe Tyr Leu Val Asp Ser Leu Leu Lys His Asn Leu Asp Ile Asn Ala 275 280 285

Thr Asp Val Gly Gly Leu Thr Val Leu His Arg Ala Ile Ile Gly Lys 290 295 300

Lys Gln Ala Ile Thr Asn Tyr Leu Leu Arg Glu Ser Ala Asn Pro Phe 305 \$310\$

Val Leu Asp Asp Glu Gly Ala Thr Leu Met His Tyr Ala Val Gln Thr 325 330 335

Ala Ser Ala Pro Thr Ile Lys Leu Leu Leu Leu Tyr Asn Ala Asp Ile 340 345 350

Asn Ala Gln Asp Arg Asp Gly Trp Thr Pro Leu His Val Ala Val Gln 355 360 365

Ala Arg Arg Ser Asp Ile Val Lys Leu Leu Leu Ile Lys Gly Ala Asp 370 380

Ile Glu Val Lys Asn Lys Asp Gly Leu Thr Pro Leu Gly Leu Cys Leu 385 390 395 400

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Asp Ile Glu

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gataacgaga ttaagaacta ctggaacacg catctcaaaa agctcctgat cgataaggga 360
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Cys Gly Lys Ser Cys Arg Leu Arg Trp Ala Asn Tyr Leu Lys Pro Asp
Ile Lys Arg Gly Glu Phe Ser Tyr Glu Glu Glu Gln Ile Ile Met
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Leu His Ala Ser Arg Gly Asn Lys Trp Ser Val Ile Ala Arg His Leu $85 \hspace{0.25in} 90 \hspace{0.25in} 95$

Pro Lys Arg Thr Asp Asn Glu Ile Lys Asn Tyr Trp Asn Thr His Leu 100 \$105\$

Lys Lys Leu Leu Ile Asp Lys Gly Ile Asp Pro Val Thr His Lys Pro 115 120 125

Leu Ala Tyr Asp Ser Asn Pro Asp Glu Gln Ser Gln Ser Gly Ser Ile 130 135 140

Ser Pro Lys Ser Leu Pro Pro Ser Ser Ser Lys Asn Val Pro Glu Ile 145 150 155 160

Thr Ser Ser Asp Glu Thr Pro Lys Tyr Asp Ala Ser Leu Ser Ser Lys 165 170 175

Lys Arg Cys Phe Lys Arg Ser Ser Ser Thr Ser Lys Leu Leu Asn Lys 180 185 190

Val Ala Ala Arg Ala Ser Ser Met Gly Thr Ile Leu Gly Ala Ser Ile 195 200 205

Glu Gly Thr Leu Ile Ser Ser Thr Pro Leu Ser Ser Cys Leu Asn Asp 210 215 220

Asp Phe Ser Glu Thr Ser Gln Phe Gln Met Glu Glu Phe Asp Pro Phe 225 230 235 240

Tyr Gln Ser Ser Glu His Ile Ile Asp His Met Lys Glu Asp Ile Ser 245 250 255

Ile Asn Asn Ser Glu Tyr Asn Phe Ser Gln Phe Leu Glu Gln Phe Ser 260 265 270

Asn Asn Glu Gly Glu Glu Ala Asp Asn Thr Gly Gly Gly Tyr Asn Gln 275 280 285

Asp Leu Met Ser Asp Val Ser Ser Thr Ser Val Asp Glu Asp Glu 290 295 300

Met Met Gln Asn Ile Thr Gly Trp Ser Asn Tyr Leu Leu Asp His Ser 305 310 315

Asp Phe Asn Tyr Asp Thr Ser Gln Asp Tyr Asp Asp Lys Asn Phe Ile 325 330 335

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<213> Arabidopsis thaliana

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Gly Glu Phe Leu His Gly Asp Ser Asp Ser Lys Asp His Gln Pro Asn 20 25 30

Glu Ser Pro Val Glu Arg His His Glu Ser Ser Ile Lys Glu Val Asp $35 \hspace{1cm} 40 \hspace{1cm} 45$

Phe Phe Ala Ala Lys Ser Gln Pro Phe Asp Leu Gly His Val Arg Thr 50 55 60

Thr Thr Ile Val Gly Ser Ser Gly Phe Asn Asp Gly Leu Gly Leu Val 65 70 75 80

Asn Ser Cys His Gly Thr Ser Ser Asn Asp Gly Asp Asp Lys Thr Lys 85 90 95 Thr Gln Ile Ser Arg Leu Lys Leu Glu Leu Glu Arg Leu His Glu Glu 100 105 110

Asn His Lys Leu Lys His Leu Leu Asp Glu Val Ser Glu Ser Tyr Asn 115 120 125

Asp Leu Gln Arg Arg Val Leu Leu Ala Arg Gln Thr Gln Val Glu Gly 130 \$135\$

Leu His His Lys Gln His Glu Asp Val Pro Gln Ala Gly Ser Ser Gln 145 150 155 160

Ala Leu Glu Asn Arg Arg Pro Lys Asp Met Asn His Glu Thr Pro Ala 165 170 175

Thr Thr Leu Lys Arg Arg Ser Pro Asp Asp Val Asp Gly Arg Asp Met 180 185 190

His Arg Gly Ser Pro Lys Thr Pro Arg Ile Asp Gln Asn Lys Ser Thr 195 200 205

Asn His Glu Glu Gln Gln Asn Pro His Asp Gln Leu Pro Tyr Arg Lys 210 215 220

Ala Arg Val Ser Val Arg Ala Arg Ser Asp Ala Thr Thr Val Asp Asp 225 230 235 240

Cys Pro Arg Ala Tyr Tyr Arg Cys Thr Met Ala Val Gly Cys Pro Val 260 265 270

Arg Lys Gln Val Gln Arg Cys Ala Glu Asp Thr Thr Ile Leu Thr Thr 275 280 285

Thr Tyr Glu Gly Asn His Asn His Pro Leu Pro Pro Ser Ala Thr Ala 290 295 300

Met Ala Ala Thr Thr Ser Ala Ala Ala Ala Met Leu Leu Ser Gly Ser 305 310 315 320

Ser Ser Ser Asn Leu His Gln Thr Leu Ser Ser Pro Ser Ala Thr Ser 325

Ser Ser Ser Phe Tyr His Asn Phe Pro Tyr Thr Ser Thr Ile Ala Thr 340 345 350

Leu Ser Ala Ser Ala Pro Phe Pro Thr Ile Thr Leu Asp Leu Thr Asn 355 360 365

Pro Pro Arg Pro Leu Gln Pro Pro Pro Gln Phe Leu Ser Gln Tyr Gly 370 380

Pro Ala Ala Phe Leu Pro Asn Ala Asn Gln Ile Arg Ser Met Asn Asn 385 390 395 400

Asn Asn Gln Gln Leu Leu Ile Pro Asn Leu Phe Gly Pro Gln Ala Pro 405 410 415

Pro Arg Glu Met Val Asp Ser Val Arg Ala Ala Ile Ala Met Asp Pro 420 425 430

Asn Phe Thr Ala Ala Leu Ala Ala Ala Ile Ser Asn Ile Ile Gly Gly 435 440

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Gly His Ser Asn Trp Arg Ala Leu Pro Lys Gln Ala Gly Leu Leu Arg 35 40 45

Cys Gly Lys Ser Cys Arg Leu Arg Trp Met Asn Tyr Leu Lys Pro Asp 50 55 60

Ile Lys Arg Gly Asn Phe Thr Lys Glu Glu Glu Asp Ala Ile Ile Ser 65 70 75 80

Leu His Gln Ile Leu Gly Asn Arg Trp Ser Ala Ile Ala Ala Lys Leu $85 \hspace{1.5cm} 90 \hspace{1.5cm} 95$

Pro Gly Arg Thr Asp Asn Glu Ile Lys Asn Val Trp His Thr His Leu $100 \hspace{1cm} 105 \hspace{1cm} 105$

Lys Lys Arg Leu Glu Asp Tyr Gln Pro Ala Lys Pro Lys Thr Ser Asn 115 120 125

Lys Lys Lys Gly Thr Lys Pro Lys Ser Glu Ser Val Ile Thr Ser Ser 130 135 140

Asn Ser Thr Arg Ser Glu Ser Glu Leu Ala Asp Ser Ser Asn Pro Ser 145 150 155 160

Gly Glu Ser Leu Phe Ser Thr Ser Pro Ser Thr Ser Glu Val Ser Ser 165 170 175

Met Thr Leu Ile Ser His Asp Gly Tyr Ser Asn Glu Ile Asn Met Asp 180 185 190

Asn Lys Pro Gly Asp Ile Ser Thr Ile Asp Gln Glu Cys Val Ser Phe 195 200 205

Glu Thr Phe Gly Ala Asp Ile Asp Glu Ser Phe Trp Lys Glu Thr Leu 210 $$ 215 $$ 220

Tyr Ser Gln Asp Glu His Asn Tyr Val Ser Asn Asp Leu Glu Val Ala 225 230 235 240

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Val Ser Gly Ser Gly Ser Val Ser Gly Gly Pro Asp Pro Val Asp Glu
Leu Met Ser Lys Ile Leu Gly Ser Phe His Lys Thr Ile Ser Val Leu
Asp Ser Phe Asp Pro Val Ala Val Ser Val Pro Ile Ala Val Glu Gly
                 85
                                     90
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1296

Ser Trp Asn Ala Ser Cys Gly Asp Asp Ser Ala Thr Pro Val Ser Cys 100 105 110

Asn Gly Gly Asp Ser Gly Glu Ser Lys Lys Lys Arg Leu Gly Val Gly 115 120 125

Lys Gly Lys Arg Gly Cys Tyr Thr Arg Lys Thr Arg Ser His Thr Arg 130 135 140

Ile Val Glu Ala Lys Ser Ser Glu Asp Arg Tyr Ala Trp Arg Lys Tyr 145 150 155 160

Gly Gln Lys Glu Ile Leu Asn Thr Thr Phe Pro Arg Ser Tyr Phe Arg 165 170 175

Cys Thr His Lys Pro Thr Gln Gly Cys Lys Ala Thr Lys Gln Val Gln 180 185 190

Lys Gln Asp Gln Asp Ser Glu Met Phe Gln Ile Thr Tyr Ile Gly Tyr 195 200 205

His Thr Cys Thr Ala Asn Asp Gln Thr His Ala Lys Thr Glu Pro Phe 210 220

Asp Gln Glu Ile Ile Met Asp Ser Glu Lys Thr Leu Ala Ala Ser Thr 225 230 235 240

Ala Gln Asn His Val Asn Ala Met Val Gln Glu Glu Glu Asn Asn Thr \$245\$

 Ser
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 Thr
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 Ile
 Asp
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 Gly
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Gln Asn His Tyr Tyr Cys Gly Glu Thr Ser Thr Thr Ser His Gln Phe 305 310 315

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<210> 66 <211> 344 <212> PRT <213> Arab

<213> Arabidopsis thaliana

<220> <223> G867

<400> 66

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Cys Glu Thr Pro Ala Ile Thr Pro Ala Lys Lys Ser Ser Val Gly Asn 20 25 30

Gly Val Glu Ala Glu Ser Arg Lys Leu Pro Ser Ser Lys Tyr Lys Gly
50 55 60

Val Val Pro Gln Pro Asn Gly Arg Trp Gly Ala Gln Ile Tyr Glu Lys 65 70 75 80

His Gln Arg Val Trp Leu Gly Thr Phe Asn Glu Glu Asp Glu Ala Ala 85 90 95

Arg Ala Tyr Asp Val Ala Val His Arg Phe Arg Arg Arg Asp Ala Val $100 \ 105 \ 110$

Thr Asn Phe Lys Asp Val Lys Met Asp Glu Asp Glu Val Asp Phe Leu 115 120 125 Asn Ser His Ser Lys Ser Glu Ile Val Asp Met Leu Arg Lys His Thr 130 135 140

Tyr Asn Glu Glu Leu Glu Gln Ser Lys Arg Arg Arg Asn Gly Asn Gly 145 150150155155

Asn Met Thr Arg Thr Leu Leu Thr Ser Gly Leu Ser Asn Asp Gly Val

Ser Thr Thr Gly Phe Arg Ser Ala Glu Ala Leu Phe Glu Lys Ala Val 180 \$180\$

Thr Pro Ser Asp Val Gly Lys Leu Asn Arg Leu Val Ile Pro Lys His

His Ala Glu Lys His Phe Pro Leu Pro Ser Ser Asn Val Ser Val Lys 210 215 220

Gly Val Leu Leu Asn Phe Glu Asp Val Asn Gly Lys Val Trp Arg Phe 225 230 235 240

Arg Tyr Ser Tyr Trp Asn Ser Ser Gln Ser Tyr Val Leu Thr Lys Gly 245 250 255

Trp Ser Arg Phe Val Lys Glu Lys Asn Leu Arg Ala Gly Asp Val Val 260 265 270

Ser Phe Ser Arg Ser Asn Gly Gln Asp Gln Gln Leu Tyr Ile Gly Trp 275 280 285

Lys Ser Arg Ser Gly Ser Asp Leu Asp Ala Gly Arg Val Leu Arg Leu 290 295 300

Phe Gly Val Asn Ile Ser Pro Glu Ser Ser Arg Asn Asp Val Val Gly 305 310 315 320

Asn Lys Arg Val Asn Asp Thr Glu Met Leu Ser Leu Val Cys Ser Lys 325 330 335

Lys Gln Arg Ile Phe His Ala Ser

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<220>

<223> G659

<400> 67

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tctgggggtt ccaaccaaca agatgatcca aagatagacg aactcaggtt tgagtatata 660
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<210> 68 <211> 327

<211> 327 <212> PRT

<213> Arabidopsis thaliana

<220> <223> G659

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Lys Phe Gly His Glu Asn Trp Arg Ser Leu Pro Lys Gln Ser Gly Met 35 40 45

Ser Leu Leu Leu Ser Ser Gln Ser Lys Gln Lys Pro Leu Gln Leu Phe 50 55 60

Phe Leu Phe Phe Met Ile Leu Asn Val Tyr Ile Cys Lys Asn Glu Gly 65 70 75 80

Leu Leu Arg Cys Gly Lys Ser Cys Arg Leu Arg Trp Ile Asn Tyr Leu 85 90 95

Arg Pro Asp Leu Lys Arg Gly Asn Phe Thr Ser Glu Glu Glu Ghr Thr

Ile Ile Lys Leu His His Asn Tyr Gly Asn Lys Trp Ser Lys Ile Ala 115 120 125

Ser Gln Leu Pro Gly Arg Thr Asp Asn Glu Ile Lys Asn Val Trp His 130 135 140

Thr His Leu Lys Lys Arg Leu Ala Gln Ser Ser Gly Thr Ala Asp Glu 145 150 155 160

Pro Ala Ser Pro Cys Ser Ser Asp Ser Val Ser Arg Gly Lys Asp Asp 165 170 175

Lys Ser Ser His Val Glu Asp Ser Leu Asn Arg Glu Thr Asn His Arg 180 185 190

Asn Glu Leu Ser Thr Ser Met Ser Ser Gly Gly Ser Asn Gln Gln Asp 195 200 205

Asp Pro Lys Ile Asp Glu Leu Arg Phe Glu Tyr Ile Glu Glu Ala Tyr 210 215 220

Ser Glu Phe Asn Asp Ile Ile Ile Gln Glu Val Asp Lys Pro Asp Leu 225 230 235

Leu Glu Ile Pro Phe Asp Ser Asp Pro Asp Ile Trp Ser Phe Leu Asp 245 250 255

Thr Ser Asn Ser Phe Gln Gln Ser Thr Ala Asn Glu Asn Ser Ser Gly 260 265 270

Ser Arg Ala Thr Thr Glu Glu Glu Ser Asp Glu Asp Glu Val Lys Lys 275 280 ^285

Trp Phe Lys His Leu Glu Ser Glu Leu Gly Leu Glu Glu Asp Asp Asn 290 295 300

Gln Gln Gln Tyr Lys Glu Glu Glu Ser Ser Ser Ser Ser Leu Leu Lys 305 310 315 320

Asn Tyr Glu Leu Met Ile His 325

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<220>

<223> G620

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<210> 70

<211> 208

<212> PRT

<213> Arabidopsis thaliana

<220> <223> G620

<400> 70

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Ile Val Val Gln Gln Gln Pro Pro Cys Val Ala Arg Glu Gln Asp Gln 20 \$25\$

Tyr Met Pro Ile Ala Asn Val Ile Arg Ile Met Arg Lys Thr Leu Pro $35 \ \ \, 40 \ \ \, 45$

Ser His Ala Lys Ile Ser Asp Asp Ala Lys Glu Thr Ile Gln Glu Cys 50 55 60

Val Ser Glu Tyr Ile Ser Phe Val Thr Gly Glu Ala Asn Glu Arg Cys 65 70 75 80

Gln Arg Glu Gln Arg Lys Thr Ile Thr Ala Glu Asp Ile Leu Trp Ala . 85 90 95

Met Ser Lys Leu Gly Phe Asp Asn Tyr Val Asp Pro Leu Thr Val Phe

Ile Asn Arg Tyr Arg Glu Ile Glu Thr Asp Arg Gly Ser Ala Leu Arg 115 120 125

Gly Glu Pro Pro Ser Leu Arg Gln Thr Tyr Gly Gly Asn Gly Ile Gly 130 135 140

Phe His Gly Pro Ser His Gly Leu Pro Pro Pro Gly Pro Tyr Gly Tyr 145 \$150\$

Gly Met Leu Asp Gln Ser Met Val Met Gly Gly Gly Arg Tyr Tyr Gln 165 170 175

Asn Gly Ser Ser Gly Gln Asp Glu Ser Ser Val Gly Gly Gly Ser Ser 180 $$180\$

Ser Ser Ile Asn Gly Met Pro Ala Phe Asp His Tyr Gly Gln Tyr Lys 195 200 205

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<211> 317
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<212> PRT

<213> Arabidopsis thaliana

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<223> G596

<400> 72

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Leu His Leu His Pro His His Gln Phe Gln His Gln Gln Gln Gln Gln Gln 20 \$25\$

Gln Gln Asn His Gly His Asp Ile Asp Gln His Arg Ile Gly Gly Leu 35 40 45

Lys Arg Asp Arg Asp Ala Asp Ile Asp Pro Asn Glu His Ser Ser Ala 50 60

Gly Lys Asp Gln Ser Thr Pro Gly Ser Gly Gly Glu Ser Gly Gly Gly 65 70 75 80

Gly Gly Gly Asp Asn His Ile Thr Arg Arg Pro Arg Gly Arg Pro Ala 85 90 95

Gly Ser Lys Asn Lys Pro Lys Pro Pro Ile Ile Ile Thr Arg Asp Ser 100 105 110

Ala Asn Ala Leu Lys Ser His Val Met Glu Val Ala Asn Gly Cys Asp 115 120 125

Val Met Glu Ser Val Thr Val Phe Ala Arg Arg Arg Gln Arg Gly Ile 130 135 140 Cys Val Leu Ser Gly Asn Gly Ala Val Thr Asn Val Thr Ile Arg Gln 145 150

Pro Ala Ser Val Pro Gly Gly Gly Ser Ser Val Val Asn Leu His Gly 165 170

Arg Phe Glu Ile Leu Ser Leu Ser Gly Ser Phe Leu Pro Pro Pro Ala

Pro Pro Ala Ala Ser Gly Leu Thr Ile Tyr Leu Ala Gly Gly Gln Gly

Gln Val Val Gly Gly Ser Val Val Gly Pro Leu Met Ala Ser Gly Pro

Val Val Ile Met Ala Ala Ser Phe Gly Asn Ala Ala Tyr Glu Arg Leu 225

Pro Leu Glu Glu Asp Asp Gln Glu Glu Gln Thr Ala Gly Ala Val Ala 245 250

Asn Asn Ile Asp Gly Asn Ala Thr Met Gly Gly Gly Thr Gln Thr Gln

Thr Gln Thr Gln Gln Gln Gln Gln Gln Leu Met Gln Asp Pro Thr 280

Ser Phe Ile Gln Gly Leu Pro Pro Asn Leu Met Asn Ser Val Gln Leu 295

Pro Ala Glu Ala Tyr Trp Gly Thr Pro Arg Pro Ser Phe 310 315

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<213> Arabidopsis thaliana

<220>

<223> G511

<400> 74

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Asp Ser Met His Arg Val Ile Pro Val Leu Asp Val Phe Glu Val Glu 35 40 45

Pro Ser His Leu Pro Asn Val Ala Gly Val Arg Cys Arg Gly Asp Ala 50 55 60

Glu Gln Trp Phe Phe Phe Val Pro Arg Gln Glu Arg Glu Ala Arg Gly 65 70 75 80

Gly Arg Pro Ser Arg Thr Thr Gly Ser Gly Tyr Trp Lys Ala Thr Gly 85 90 95

Ser Pro Gly Pro Val Phe Ser Lys Asp Asn Lys Met Ile Gly Ala Lys 100 105 110

Lys Thr Met Val Phe Tyr Thr Gly Lys Ala Pro Thr Gly Arg Lys Thr 115 120 125

Lys Trp Lys Met Asn Glu Tyr His Ala Val Asp Glu Thr Val Asn Ala 130 135 140

Ser Thr Ile Pro Lys Leu Arg Arg Glu Phe Ser Leu Cys Arg Val Tyr 145 150 155 160

Ile Thr Thr Gly Ser Ser Arg Ala Phe Asp Arg Arg Pro Glu Gly Val

Leu Gln Thr Glu Arg Met Leu Thr Ser Asp Val Ala Val Ala Glu Thr 180 185 190

Ser Phe Arg Val Glu Ser Ser Leu Glu Thr Ser Ile Ser Gly Glu Glu 195 $$ 200 $$ 205

His Ile Asp Val Ser Met Asn Thr Glu Phe Val Asp Gly Leu Ser Glu 210 215 220

Pro Met Trp Asp Trp Glu Gln Leu Thr Trp Pro 225 230 235

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<213> Arabidopsis thaliana
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<223> G471
<400> 75
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agggcagage cegagactga egaagtatat gegcaaataa cettattqee aqaactqqat 420
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<213> Arabidopsis thaliana

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<223> G471

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Thr Leu Pro Arg Glu Gly Glu Arg Val Tyr Tyr Phe Pro Glu Gly His 35 40 45

Met Glu Gln Leu Glu Ala Ser Met His Gln Gly Leu Glu Gln Gln Met 50 55 60

Pro Ser Phe Asn Leu Pro Ser Lys Ile Leu Cys Lys Val Ile Asn Ile 65 70 75 80

Gln Arg Arg Ala Glu Pro Glu Thr Asp Glu Val Tyr Ala Gln Ile Thr 85 90 95

Leu Leu Pro Glu Leu Asp Gln Ser Glu Pro Thr Ser Pro Asp Ala Pro 100 105 110

Val Gln Glu Pro Glu Lys Cys Thr Val His Ser Phe Cys Lys Thr Leu 115 120 125

Thr Ala Ser Asp Thr Ser Thr His Gly Gly Phe Ser Val Leu Arg Arg 130 135 140

His Ala Asp Asp Cys Leu Pro Pro Leu Asp Met Ser Gln Gln Pro Pro 145 150 155 160

Trp Gln Glu Leu Val Ala Thr Asp Leu His Asn Ser Glu Trp His Phe \$165\$ \$170\$ \$175\$

Arg His Ile Phe Arg Gly Gln Pro Arg Arg His Leu Leu Thr Thr Gly 180 185 190

Trp Ser Val Phe Val Ser Ser Lys Lys Leu Val Ala Gly Asp Ala Phe
195 200 205

Ile Phe Leu Arg Gly Glu Asn Glu Glu Leu Arg Val Gly Val Arg Arg 210 215 220

His Met Arg Gln Gln Thr Asn Ile Pro Ser Ser Val Ile Ser Ser His 225 230 240

Ser Met His Ile Gly Val Leu Ala Thr Ala Ala His Ala Ile Thr Thr 245 250 255

Gly Thr Ile Phe Ser Val Phe Tyr Lys Pro Arg Thr Ser Arg Ser Glu 260 265 270

Phe Ile Val Ser Val Asn Arg Tyr Leu Glu Ala Lys Thr Gln Lys Leu 275 280 285

Ser Val Gly Met Arg Phe Lys Met Arg Phe Glu Gly Glu Glu Ala Pro 290 295 300

Glu Lys Arg Phe Ser Gly Thr Ile Val Gly Val Gln Glu Asn Lys Ser 305 Ser Val Trp His Asp Ser Glu Trp Arg Ser Leu Lys Val Gln Trp Asp Glu Pro Ser Ser Val Phe Arg Pro Glu Arg Val Ser Pro Trp Glu Leu Glu Pro Leu Val Ala Asn Ser Thr Pro Ser Ser Gln Pro Gln Pro Pro Gln Arg Asn Lys Arg Pro Arg Pro Pro Gly Leu Pro Ser Pro Ala Thr Gly Pro Ser Gly Pro Val Thr Pro Asp Gly Val Trp Lys Ser Pro Ala Asp Thr Pro Ser Ser Val Pro Leu Phe Ser Pro Pro Ala Lys Ala Ala Thr Phe Gly His Gly Gly Asn Lys Ser Phe Gly Val Ser Ile Gly Ser Ala Phe Trp Pro Thr Asn Ala Asp Ser Ala Ala Glu Ser Phe Ala Ser Ala Phe Asn Asn Glu Ser Thr Glu Lys Lys Gln Thr Asn Gly Asn Val 450 455 Cys Arg Leu Phe Gly Phe Glu Leu Val Glu Asn Val Asn Val Asp Glu 470 475 Cys Phe Ser Ala Ala Ser Val Ser Gly Ala Val Ala Val Asp Gln Pro 485 Val Pro Ser Asn Glu Phe Asp Ser Gly Gln Gln Ser Glu Pro Leu Asn Ile Asn Gln Ser Asp Ile Pro Ser Gly Ser Gly Asp Pro Glu Lys Ser 515 Ser Leu Arg Ser Pro Gln Glu Ser Gln Ser Arg Gln Ile Arg Ser Cys 535 Thr Lys Val His Met Gln Gly Ser Ala Val Gly Arg Ala Ile Asp Leu

Thr Arg Ser Glu Cys Tyr Glu Asp Leu Phe Lys Lys Leu Glu Glu Met 565 570 575

Phe Asp Ile Lys Gly Glu Leu Leu Glu Ser Thr Lys Lys Trp Gln Val 580 585 585

550

Val Tyr Thr Asp Asp Glu Asp Asp Met Met Wal Gly Asp Asp Pro 595 600 605 Trp Asn Glu Phe Cys Gly Met Val Arg Lys Ile Phe Ile Tyr Thr Pro $610 \hspace{1.5cm} 615 \hspace{1.5cm} 620$

Glu Glu Val Lys Lys Leu Ser Pro Lys Asn Lys Leu Ala Val Asn Ala 625 630 635

Arg Met Gln Leu Lys Ala Asp Ala Glu Glu Asn Gly Asn Thr Glu Gly 645 650 655

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Arg Asp Asp Glu Phe Asp Ser Pro Asn Thr Lys Ser Gly Ser Glu Asn 35 40 45

Gln Glu Gly Gly Ser Gly Asn Asp Gln Asp Pro Leu His Pro Asn Lys 50 60

Lys Lys Arg Tyr His Arg His Thr Gln Leu Gln Ile Gln Glu Met Glu 65 70 75 80

Ala Phe Phe Lys Glu Cys Pro His Pro Asp Asp Lys Gln Arg Lys Gln 85 90 95

Leu Ser Arg Glu Leu Asn Leu Glu Pro Leu Gln Val Lys Phe Trp Phe 100 105 110

Glm Asn Lys Arg Thr Gln Met Lys Asn His His Glu Arg His Glu Asn 115 120 125

Ser His Leu Arg Ala Glu Asn Glu Lys Leu Arg Asn Asp Asn Leu Arg 130 140

Tyr Arg Glu Ala Leu Ala Asn Ala Ser Cys Pro Asn Cys Gly Gly Pro 145 150 155 160

Thr Ala Ile Gly Glu Met Ser Phe Asp Glu His Gln Leu Arg Leu Glu 165 170 . 175

Asn Ala Arg Leu Arg Glu Glu Ile Asp Arg Ile Ser Ala Ile Ala Ala 180 185 190

Lys Tyr Val Gly Lys Pro Val Ser Asn Tyr Pro Leu Met Ser Pro Pro 195 200 205

Pro Leu Pro Pro Arg Pro Leu Glu Leu Ala Met Gly Asn Ile Gly Gly 210 215 220

Glu Ala Tyr Gly Asn Asn Pro Asn Asp Leu Leu Lys Ser Ile Thr Ala 225 230 235 240 Pro Thr Glu Ser Asp Lys Pro Val Ile Ile Asp Leu Ser Val Ala Ala 245 250 255

Met Glu Glu Leu Met Arg Met Val Gln Val Asp Glu Pro Leu Trp Lys 260 265 270

Ser Leu Ala Leu Asp Glu Glu Glu Tyr Ala Arg Thr Phe Pro Arg Gly 275 280 285

Ile Gly Pro Arg Pro Ala Gly Tyr Arg Ser Glu Ala Ser Arg Glu Ser 290 295 300

Ala Val Val Ile Met Asn His Val Asn Ile Val Glu Ile Leu Met Asp 305 $$ 310 $$ 310 $$ 320

Val Asn Gln Trp Ser Thr Ile Phe Ala Gly Met Val Ser Arg Ala Met 325 330 335

Thr Leu Ala Val Leu Ser Thr Gly Val Ala Gly Asn Tyr Asn Gly Ala 340 345 350

Leu Gln Val Met Ser Ala Glu Phe Gln Val Pro Ser Pro Leu Val Pro 355 360 365

Thr Arg Glu Thr Tyr Phe Ala Arg Tyr Cys Lys Gln Gln Gly Asp Gly 370 375 380

Ser Trp Ala Val Val Asp Ile Ser Leu Asp Ser Leu Gln Pro Asn Pro 385 390 395

Pro Ala Arg Cys Arg Arg Arg Ala Ser Gly Cys Leu Ile Gln Glu Leu 405 410 415

Pro Asn Gly Tyr Ser Lys Val Thr Trp Val Glu His Val Glu Val Asp 420 425 430

Asp Arg Gly Val His Asn Leu Tyr Lys His Met Val Ser Thr Gly His $435 \ \ \, 440 \ \ \, 445$

Ala Phe Gly Ala Lys Arg Trp Val Ala Ile Leu Asp Arg Gln Cys Glu 450 450

Arg Leu Ala Ser Val Met Ala Thr Asn Ile Ser Ser Gly Glu Val Gly 465 470475475

Val Ile Thr Asn Gln Glu Gly Arg Arg Ser Met Leu Lys Leu Ala Glu 485 490 495

Arg Met Val Ile Ser Phe Cys Ala Gly Val Ser Ala Ser Thr Ala His $500 \hspace{1cm} 505 \hspace{1cm} 510 \hspace{1cm}$

Thr Trp Thr Thr Leu Ser Gly Thr Gly Ala Glu Asp Val Arg Val Met $515 \hspace{1.5cm} 520 \hspace{1.5cm} 525 \hspace{1.5cm}$

Thr Arg Lys Ser Val Asp Asp Pro Gly Arg Ser Pro Gly Ile Val Leu 530 535 540

Ser Ala Ala Thr Ser Phe Trp Ile Pro Val Pro Pro Lys Arg Val Phe 545 550 555 560 Asp Phe Leu Arg Asp Glu Asn Ser Arg Asn Glu Trp Asp Ile Leu Ser 570 Asn Gly Gly Val Val Gln Glu Met Ala His Ile Ala Asn Gly Arg Asp 580 585 Thr Gly Asn Cys Val Ser Leu Leu Arg Val Asn Ser Ala Asn Ser Ser Gln Ser Asn Met Leu Ile Leu Gln Glu Ser Cys Ile Asp Pro Thr Ala Ser Phe Val Ile Tyr Ala Pro Val Asp Ile Val Ala Met Asn Ile Val 625 Leu Asn Gly Gly Asp Pro Asp Tyr Val Ala Leu Leu Pro Ser Gly Phe 650 Ala Ile Leu Pro Asp Gly Asn Ala Asn Ser Gly Ala Pro Gly Gly Asp Gly Ser Leu Leu Thr Val Ala Phe Gln Ile Leu Val Asp Ser Val 680 Pro Thr Ala Lys Leu Ser Leu Gly Ser Val Ala Thr Val Asn Asn Leu 695 Ile Ala Cys Thr Val Glu Arg Ile Lys Ala Ser Met Ser Cys Glu Thr 710 715 720 Ala <210> 79 <211> 1857 <212> DNA <213> Arabidopsis thaliana <220> <223> G261 <400> 79 gtttaggttc gagaagcaga gagggttcga gaagctaata agggtttctt ctttttgatt 60 ttaatgctaa aagggttcta gattcgttga attttacaag qqttttaggg qttcttagaa 120 gettttgett gattgtettt tatttagaaa caqtqqtqaq tttttaqtet tteaetttqt 180 tcaagttcga agcttttttt ggagggaatt ttqqqcttct qattttqatc qaaacttact 240 gatagtaagt totttgagto otoottaact gtagtttotg tgtactgaag ttattgaatt 300 gaaagttttt atcttttttg gttattgaaa ctttcataqt ttqatcaaaa qaqtctcttq 360 ctctgttttt ggctctgttt ttgtgagtgt gattgtaagc tttgttgtga gtagattgaa 420 tcaaggagtg tgagagttgt taaaagtgtt ttcagagatg qatqagaata atcatqqaqt 480

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Glu Phe Ser Arg Asp Leu Leu Pro Arg Phe Phe Lys His Asn Asn Phe 50 55 60

Ser Ser Phe Ile Arg Gln Leu Asn Thr Tyr Gly Phe Arg Lys Ala Asp 65 70 75 80

Pro Glu Gln Trp Glu Phe Ala Asn Asp Asp Phe Val Arg Gly Gln Pro 85 90 95

His Leu Met Lys Asn Ile His Arg Arg Lys Pro Val His Ser His Ser 100 105 110

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Gln Lys Thr Met Val Ser Phe Val Ser Gln Val Leu Glu Lys Pro Gly 180 185 190

Leu Ala Leu Asn Leu Ser Pro Cys Val Pro Glu Thr Asn Glu Arg Lys 195 200 205

Arg Arg Phe Pro Arg Ile Glu Phe Phe Pro Asp Glu Pro Met Leu Glu 210 215 220

Glu Asn Lys Thr Cys Val Val Val Arg Glu Glu Gly Ser Thr Ser Pro 225 230 235 240

Ser Ser His Thr Arg Glu His Gln Val Glu Gln Leu Glu Ser Ser Ile 245 250 255

Ala Ile Trp Glu Asn Leu Val Ser Asp Ser Cys Glu Ser Met Leu Gln 260 265 270

Ser Arg Ser Met Met Thr Leu Asp Val Asp Glu Ser Ser Thr Phe Pro 275 280 285

Glu Ser Pro Pro Leu Ser Cys Ile Gln Leu Ser Val Asp Ser Arg Leu 290 295. 300

Lys Ser Pro Pro Ser Pro Arg Ile Ile Asp Met Asn Cys Glu Pro Asp 305 310 315 320

Gly Ser Lys Glu Gln Asn Thr Val Ala Ala Pro Pro Pro Pro Pro Val 325 330 335

Ala Gly Ala Asn Asp Gly Phe Trp Gln Gln Phe Phe Ser Glu Asn Pro 340 345

Gly Ser Thr Glu Gln Arg Glu Val Gln Leu Glu Arg Lys Asp Asp Lys $355 \hspace{1cm} 360 \hspace{1cm} 365 \hspace{1cm} 365 \hspace{1cm}$

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Ile Arg Asp Pro Ser Lys Gly Val Arg Val Trp Leu Gly Thr Phe Lys 65 70 75 80

Thr Ala Asp Glu Ala Ala Arg Ala Tyr Asp Val Ala Ala Ile Lys Ile 85 90 95

Arg Gly Arg Lys Ala Lys Leu Asn Phe Pro Asn Thr Gln Val Glu Glu
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Glu Ala Asp Thr Lys Pro Gly Gly Asn Gln Asn Glu Leu Ile Ser Glu 115 120 125

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Ser Thr Tyr Ala Ser Glu Ala Asp Asn Leu Asp His Leu Gly Gly Leu 65 70 75 80

Ile Lys Gln Glu Leu Glu Asp Gly Tyr Thr Thr Lys Pro Cys Lys Ser 85 90 95

Glu Phe Phe Asp Pro Gly Asn Pro Ala Ser Lys Ser Thr Ser Glu Asn 100 \$105\$

Thr Ser Val Thr Cys Leu Pro Phe Ser Ser Phe Glu Asn Asp Cys Ile 115 120 125

Leu Glu Gln Thr Pro Val Ser Asp Cys Lys Arg Ala Ser Gly Leu Lys 130 135 140

Ser Leu Val Gly Ser Ile Thr Glu Glu Thr Cys Val Val Asn Glu Asp 145 150 155 160

Ala Gly Ser Glu Gln Gly Ala Asn Thr Phe Ser Leu Lys Asp Pro Ser 165 \$170\$

Gln Leu His Ser Gln Ser Pro Glu Ser Val Leu Leu Asp Gly Asp Val 180 185 190

Lys Leu Ala Pro Cys Thr Asp Gln Val Pro Asn Asp Ser Phe Lys Gly

Tyr Arg Asn His Ser Lys Leu Val Cys Arg Asp Asp Asp Glu Asn Tyr 210 215 220

Cys Lys Tyr Tyr Lys Phe Ser Asp Lys Cys Lys Ser Tyr Arg Pro Leu 225 230 235

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Lys Leu Lys Cys Phe Glu Asp Thr Arg Thr Asp Gly Arg Leu Lys Ala 260 265 270

Leu Tyr Arg Lys Arg Lys Leu Cys Tyr Gly Tyr Asn Pro Trp Lys Arg 275 280 285

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Asp Ala Leu Ala Leu Val Pro Val Asn Glu Lys Pro Lys Arg Thr Glu 515

Leu Ser Gln Arg Arg Thr Arg Arg Leu Phe Ser Val Thr Glu Val Glu

Ala Leu Val Ser Ala Val Glu Glu Val Gly Thr Gly Arg Trp Arg Asp 545

Val Lys Leu Arg Ser Phe Glu Asn Ala Ser His Arg Thr Tyr Val Asp

Leu Lys Asp Lys Trp Lys Thr Leu Val His Thr Ala Ser Ile Ser Pro 585 590

Gln Gln Arg Arg Gly Glu Pro Val Pro Gln Glu Leu Leu Asp Arg Val 595 600 605

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Trp Leu Asn Tyr Leu Arg Pro Asp Val Arg Arg Gly Asn Ile Thr Pro

Glu Glu Gln Leu Ile Ile Met Glu Leu His Ala Lys Trp Gly Asn Arg

Trp Ser Lys Ile Ala Lys His Leu Pro Gly Arg Thr Asp Asn Glu Ile

Lys Asn Phe Cys Arg Thr Arg Ile Gln Lys Tyr Ile Lys Gln Ser Asp 120

Val Thr Thr Ser Ser Val Gly Ser His His Ser Ser Glu Ile Asn 135

Asp Gln Ala Ala Ser Thr Ser Ser His Asn Val Phe Cys Thr Gln Asp 145 150

Gln Ala Met Glu Thr Tyr Ser Pro Thr Pro Thr Ser Tyr Gln His Thr

Asn Met Glu Phe Asn Tyr Gly Asn Tyr Ser Ala Ala Ala Val Thr Ala

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Gly Asn

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Arg Ile Ser Thr Asn Gly Ser Glu Phe Arg Phe Pro Val Ser Leu Ser 50 55

Gly Ile Arg Asp Arg Glu Asp Glu Asp Phe Ser Ser Gly Val Ala Gly 65 70 75 80

Asp Asn Asp Arg Glu Val Pro Gly Glu Val Asp Phe Phe Ser Asp Lys 85 90 95

Lys Ser Arg Val Cys Arg Glu Asp Asp Glu Gly Phe Arg Val Lys 100 105 110 Glu Glu Gln Asp Asp Arg Thr Asp Val Asn Thr Gly Leu Asn Leu Arg

Thr Thr Gly Asn Thr Lys Ser Asp Glu Ser Met Ile Asp Asp Gly Glu 130 135 140

Ser Ser Glu Met Glu Asp Lys Arg Ala Lys Asn Glu Leu Val Lys Leu 145 150 155 160

Gln Asp Glu Leu Lys Lys Met Thr Met Asp Asn Gln Lys Leu Arg Glu

Leu Leu Thr Gln Val Ser Asn Ser Tyr Thr Ser Leu Gln Met His Leu 180 $$185\$

Val Ser Leu Met Gln Gln Gln Gln Gln Gln Asn Asn Lys Val Ile Glu 195 200 205

Ala Ala Glu Lys Pro Glu Glu Thr Ile Val Pro Arg Gln Phe Ile Asp 210 215 220

Leu Gly Pro Thr Arg Ala Val Gly Glu Ala Glu Asp Val Ser Asn Ser 225 230 235 240

 Ser Ser Glu Asp
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 245
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Ser Asn Lys Ile Gln Lys Val Asn Ser Thr Thr Pro Thr Thr Phe Asp 275 280 285

Gln Thr Ala Glu Ala Thr Met Arg Lys Ala Arg Val Ser Val Arg Ala 290 295 300

Arg Ser Glu Ala Pro Met Ile Ser Asp Gly Cys Gln Trp Arg Lys Tyr 305 310315320

Gly Gln Lys Met Ala Lys Gly Asn Pro Cys Pro Arg Ala Tyr Tyr Arg 325 330 335

Cys Thr Met Ala Thr Gly Cys Pro Val Arg Lys Gln Val Gln Arg Cys 340 345 350

Ala Glu Asp Arg Ser Ile Leu Ile Thr Thr Tyr Glu Gly Asn His Asn 355 360 365

His Pro Leu Pro Pro Ala Ala Val Ala Met Ala Ser Thr Thr Thr Ala 370 375 380

Ala Ala Asn Met Leu Leu Ser Gly Ser Met Ser Ser His Asp Gly Met 385 390 395 400

Met Asn Pro Thr Asn Leu Leu Ala Arg Ala Val Leu Pro Cys Ser Thr 405 410 415

Ser Met Ala Thr Ile Ser Ala Ser Ala Pro Phe Pro Thr Val Thr Leu 420 425 430

Asp Leu Thr His Ser Pro Pro Pro Pro Asn Gly Ser Asn Pro Ser Ser 435 440 445

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Gln Gln Gln Gln Gln Met Thr Asn Leu Pro Pro Gly Met Leu Pro His 465 470 475 480

Val Ile Gly Gln Ala Leu Tyr Asn Gln Ser Lys Phe Ser Gly Leu Gln 485 490 495

Phe Ser Gly Gly Ser Pro Ser Thr Ala Ala Phe Ser Gln Ser His Ala 500 505 510

Val Ala Asp Thr Ile Thr Ala Leu Thr Ala Asp Pro Asn Phe Thr Ala 515 520 525

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Tyr Tyr Asn Ser Ala Met Ala Ala Ser Gly His Pro Pro Pro Pro Tyr 50 55 60

Met Trp Asn Pro Gln His Met Met Ser Pro Ser Gly Ala Pro Tyr Ala 65 70 75 80

Ala Val Tyr Pro His Gly Gly Val Tyr Ala His Pro Gly Ile Pro 85 90 95

Met Gly Ser Leu Pro Gln Gly Gln Lys Asp Pro Pro Leu Thr Thr Pro

Gly Thr Leu Leu Ser Ile Asp Thr Pro Thr Lys Ser Thr Gly Asn Thr 115 120 125

Asp Asn Gly Leu Met Lys Lys Leu Lys Glu Phe Asp Gly Leu Ala Met 130 140

Ser Arg Asn Ser Ser Glu Thr Asp Gly Ser Thr Asp Gly Ser Asp Gly 165 170 175

Asn Thr Thr Gly Ala Asp Glu Pro Lys Leu Lys Arg Ser Arg Glu Gly 180 185 190

Thr Pro Thr Lys Asp Gly Lys Gln Leu Val Gln Ala Ser Ser Phe His 195 200 205

Ser Val Ser Pro Ser Ser Gly Asp Thr Gly Val Lys Leu Ile Gln Gly 210 215 220

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Cys Gly Lys Ser Cys Arg Leu Arg Trp Ile Asn Tyr Leu Arg Pro Asp 50 60

Leu Lys Arg Gly Asn Phe Thr His Asp Glu Asp Glu Leu Ile Ile Lys 65 70 75 80

Leu His Ser Leu Leu Gly Asn Lys Trp Ser Leu Ile Ala Ala Arg Leu 85 90 95

Pro Gly Arg Thr Asp Asn Glu Ile Lys Asn Tyr Trp Asn Thr His Ile 100 105 110

Lys Arg Lys Leu Leu Ser Lys Gly Ile Asp Pro Ala Thr His Arg Gly 115 120 125

Ile Asn Glu Ala Lys Ile Ser Asp Leu Lys Lys Thr Lys Asp Gln Ile 130 135 140

Val Lys Asp Val Ser Phe Val Thr Lys Phe Glu Glu Thr Asp Lys Ser 145 150 155 160

Gly Asp Gln Lys Gln Asn Lys Tyr Ile Arg Asn Gly Leu Val Cys Lys 165 170 175

Glu Glu Arg Val Val Val Glu Glu Lys Ile Gly Pro Asp Leu Asn Leu 180 185 190

Glu Leu Arg Ile Ser Pro Pro Trp Gln Asn Gln Arg Glu Ile Ser Thr 195 200 205

Cys Thr Ala Ser Arg Phe Tyr Met Glu Asn Asp Met Glu Cys Ser Ser 210 215 220

Glu Thr Val Lys Cys Gln Thr Glu Asn Ser Ser Ser Ile Ser Tyr Ser 225 230 235 240

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Gly Ile Arg Arg Arg Lys Trp Gly Lys Trp Val Ala Glu Ile Arg Glu 35 40 45

Pro Asn Lys Arg Ser Arg Leu Trp Leu Gly Ser Tyr Thr Thr Asp Ile 50 55 60

Ala Ala Ala Arg Ala Tyr Asp Val Ala Val Phe Tyr Leu Arg Gly Pro 65 70 . 75 80

Ser Ala Arg Leu Asn Phe Pro Asp Leu Leu Leu Gln Glu Glu Asp His 85 90 95

Leu Ser Ala Ala Thr Thr Ala Asp Met Pro Ala Ala Leu Ile Arg Glu
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Asn Tyr Asn Asn Leu Ala Ser Gln Phe Glu Ile Met Lys Lys Glu Lys 100 105 110

Gln Ser Leu Val Ser Glu Leu Gln Arg Leu Asn Glu Glu Met Gln Arg 115 120 125

Pro Lys Glu Glu Lys His His Glu Cys Cys Gly Asp Gln Gly Leu Ala 130 135 140

Leu Ser Ser Ser Thr Glu Ser His Asn Gly Lys Ser Glu Pro Glu Gly 145 150 155 160

Arg Leu Asp Gln Gly Ser Val Leu Cys Asn Asp Gly Asp Tyr Asn Asn 165 170 175

Asn Ile Lys Thr Glu Tyr Phe Arg Val Gln Gly Glu Thr Asp His Glu 180 185 190

Leu Met Asn Ile Val Glu Lys Ala Asp Asp Ser Cys Leu Thr Ser Ser 195 200 205

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Glu Leu Pro Cys Gln Ser Arg Ile Lys Leu Lys Asp Val Ala Trp Cys
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Phe Phe Arg Pro Lys Glu Asn Lys Tyr Gly Arg Gly Asp Gln Gln Met 65 70 75 80

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Ile Met Arg Asn Arg Gln Gln Ile Gly Glu Lys Lys Ile Leu Met Phe 100 105 110

Tyr Thr Ser Lys Glu Ser Lys Ser Asp Trp Val Ile His Glu Tyr His 115 120 125

Gly Phe Ser His Asn Gln Met Met Met Thr Tyr Thr Leu Cys Lys Val 130 $$135\$

Met Phe Asn Gly Gly Met Arg Glu Lys Ser Ser Ser Ser Pro Ser Ser 145 150 155 160

Ser Gly Val Ser Gly Ile Glu Gln Ser Arg Arg Asp Ser Leu Ile Pro 165 170 175

Gln Leu Val Asn Asn Ser Glu Gly Ser Ser Leu His Arg Glu Asp Pro 180 185 190

Ser Gln Phe Gly Asp Val Leu Gln Glu Ala Pro Ile Glu Asp Ala Lys 195 200 205

Leu Thr Glu Glu Leu Val Lys Trp Leu Met Asn Asp Glu Asp Asp Ala 210 215 220

Gln Ile Glu Asp Ala Ile Pro Ile Glu Glu Trp Glu Trr Trp Leu Asn 225 230 235 240

Asp Ile Asp Asp Ala Lys Glu Lys Ser Ile Met Phe Met His Asp Asp 245 \$250\$

Asp Val Ser Ser Asp Asp Asp Asp Ser Asp Leu Leu Thr Pro Lys Thr 275 280 285

Asn Ser Ile Gln Thr Ser Ser Thr Cys Asp Ser Phe Gly Ser Ser Asn 290 295 300

His Arg Ile Asp Gln Ile Lys Asp Leu Gln Glu Ser Pro Thr Ser Thr 305 310 315 320

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Gln Gln Leu Ile Arg Glu Cys Pro Ile Leu Cys Asn Ile Glu Pro Arg 50 55 60

Gln Ile Lys Val Trp Phe Gln Asn Arg Arg Cys Arg Glu Lys Gln Arg 65 70 75 80

Lys Glu Ser Ala Arg Leu Gln Thr Val Asn Arg Lys Leu Ser Ala Met $85 \hspace{1cm} 90 \hspace{1cm} 95$

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Ile Gly Met Lys Pro Gly Pro Asp Ser Ile Gly Ile Val Ala Val Ser 195 200

Arg Asn Cys Ser Gly Ile Ala Ala Arg Ala Cys Gly Leu Val Ser Leu 210 215 220

Glu Pro Met Lys Val Ala Glu Ile Leu Lys Asp Arg Pro Ser Trp Phe 225 230 235

Arg Asp Cys Arg Cys Val Glu Thr Leu Asn Val Ile Pro Thr Gly Asn 245 250 255

Gly Gly Thr Ile Glu Leu Val Asn Thr Gln Ile Tyr Ala Pro Thr Thr 260 265 270

Leu Ala Ala Ala Arg Asp Phe Trp Thr Leu Arg Tyr Ser Thr Ser Leu \$275\$ \$280\$

Glu Asp Gly Ser Tyr Val Val Cys Glu Arg Ser Leu Thr Ser Ala Thr 290 \$300\$

Gly Gly Pro Asn Gly Pro Leu Ser Ser Ser Phe Val Arg Ala Lys Met 305 \$310\$

Leu Ser Ser Gly Phe Leu Ile Arg Pro Cys Asp Gly Gly Ser Ile 325 \$330\$

Ile His Ile Val Asp His Val Asp Leu Asp Val Ser Ser Val Pro Glu 340 345 350

Val Leu Arg Pro Leu Tyr Glu Ser Ser Lys Ile Leu Ala Gln Lys Met 355 360 365

Thr Val Ala Ala Leu Arg His Val Arg Gln Ile Ala Gln Glu Thr Ser 370 380

Gly Glu Val Gln Tyr Ser Gly Gly Arg Gln Pro Ala Val Leu Arg Thr 385 \$390\$

Phe Ser Gln Arg Leu Cys Arg Gly Phe Asn Asp Ala Val Asn Gly Phe 405 410 415

Thr Ile Met Ile Asn Ser Ser Ser Ala Lys Phe Ala Gly Ser Gln Tyr 435 440 445

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Tyr Ser Pro Glu Asp Met Gly Leu Ser Arg Asp Met Tyr Leu Leu Gln 545 550 560

Leu Cys Ser Gly Val Asp Glu Asn Val Val Gly Gly Cys Ala Gln Leu 565 570 575

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Pro Ser Gly Phe Arg Val Ile Pro Leu Asp Gln Lys Thr Asn Pro Asn 595 $\,$ 600 $\,$ 605

Asp His Gln Ser Ala Ser Arg Thr Arg Asp Leu Ala Ser Ser Leu Asp 610 620

Gly Ser Thr Lys Thr Asp Ser Glu Thr Asn Ser Arg Leu Val Leu Thr 625 $$ 630 $$ 635 $$ 640

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Ser Pro Glu Ala Leu Thr Leu Val Arg Trp Ile Thr Arg Ser Tyr Ser 690 695 700

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Gln Ala Gly Leu Asp Met Leu Glu Thr Thr Leu Val Ala Leu Gln Asp 755 760 765

Ile Met Leu Asp Lys Thr Leu Asp Asp Ser Gly Arg Arg Ala Leu Cys 770 780

Ser Glu Phe Ala Lys Ile Met Gln Gln Gly Tyr Ala Asn Leu Pro Ala 785 790 795

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Phe Asp Arg Asp Tyr Asn Phe Asn Gly Ser Leu Ser Gly Leu Asn Leu 50 60

Pro Glu Lys Lys Pro Ile Lys Lys Arg Lys Ser Trp Gly Gln Gln Leu 65 70 75 80

Pro Glu Pro Lys Thr Asn Leu Pro Pro Arg Lys Arg Ala Lys Thr Gln 85 90 95

Asp Glu Lys Glu Gln Arg Arg Val Glu Arg Val Leu Arg Asn Arg Arg 100 105 110

Ala Ala Gln Ser Ser Arg Glu Arg Lys Arg Gln Glu Val Glu Ala Leu 115 120 125

Glu Val Glu Lys Arg Ala Ile Glu Arg Lys Asn Met Asp Leu Glu Met 130 135 140

Arg Leu Ala Asp Met Glu Ala Lys Tyr Tyr Leu Leu Gln Gln Glu Leu 145 150 155 160

Lys Arg Ala Ser Gly Tyr Asn Lys Thr Asn Phe Leu Ser Tyr Ser Asp 165 170 175

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Ser Pro Gln Ser Ile Gly Pro Leu Thr Ser Arg Thr Val Asp Pro Ser 210 215 220

Thr Leu Ser Pro Lys Ser Leu Ser Ser Pro Asp Ser Ser Asn Ser Asn 225 230 235

Ser Ser Asp Met Thr Gln His Pro Ala Val Val Leu Cys Asp Leu Gln 245 250

Cys Gln Ser Glu Leu Gly Gln Pro Trp Met Asn Ser Thr Tyr Leu Ser 260 265 270

Leu Arq Thr Lys Ala Leu Lys Leu Ser Val Thr Tyr Leu Ile Thr Met

Leu Thr Thr Phe Leu Ile Val Leu Gly Asn Leu Asn Gln Asn Ile Met 295

Phe Leu Met Thr Arq Phe Leu Leu Thr Pro Thr Tyr Phe Ile Gln Arq

Met Lys Ile Phe Gly Asp Arg Thr Thr Val Phe Ser Met Asn Leu Ser 330

Tyr Val Ile Phe Ser Thr Met Lys Leu Tyr Gln Thr Arg Val Cys Ile

Arg Ile Ser Leu Leu Gly Arg Arg Gln Ala Cys Ser Arg Asn Leu Ala

Arq Ser Leu Met Asn Ala Thr Met Ala Ala Leu Arq Phe Glu Ser Lys

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Gln Phe Ser Gln Val Leu Leu His Glu Met Thr Ala Ile Arg Lys Ala 785 790 795

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Arg Asp Met Thr Asp Lys Ser Gly Asn Ile Gln Pro Gly Thr Val Val 835 $$ 840 $$ 845

Asp Thr Lys Ile Cys His Pro Asn Glu Phe Asp Phe Tyr Leu Asn Ser 850 855 860

His Ala Gly Ile Gln Gly Thr Ser Arg Pro Ala His Tyr His Val Leu 865 870 870 875

Leu Asp Glu Asn Gly Phe Thr Ala Asp Gln Leu Gln Met Leu Thr Asn 885 890 895

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1274

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Gly Ile Ile Arg Arg Arg Gln Ser Arg Ala Lys Ala Glu Lys Leu Ser 145 $$ 150 $$ 155 $$ 160

Arg Cys Arg Lys Pro Tyr Met His His Ser Arg His Leu His Ala Met 165 $$170\$

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Phe His Pro Glu Asn Glu Thr Ile Asn Ser Ser Arg Glu Ala Asn Glu 210 215 220

Ser Asn Leu Ser Asp Ser Ala Val Thr Ser Met Asp Tyr Phe Leu Ser 225 230 235 240

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Asp Pro Pro Leu Ile Leu Arg Gly Ser Gly Ser Gly Asp Gly Glu Gly 50 55 60

Asn Gly Pro Leu Pro Gln Pro Pro Pro Pro Leu Tyr His Gln Gln Ser 65 70 75 80

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Thr His Pro Gln Ser Leu Ala Ser Leu Glu Pro Pro Pro Pro Pro Arg 115 120 125

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Pro Arg Cys Thr Lys Thr Asp Arg Ser Ser Met Leu Asp Asp Val Ile 305 $$ 310 $$ 310 $$ 320

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